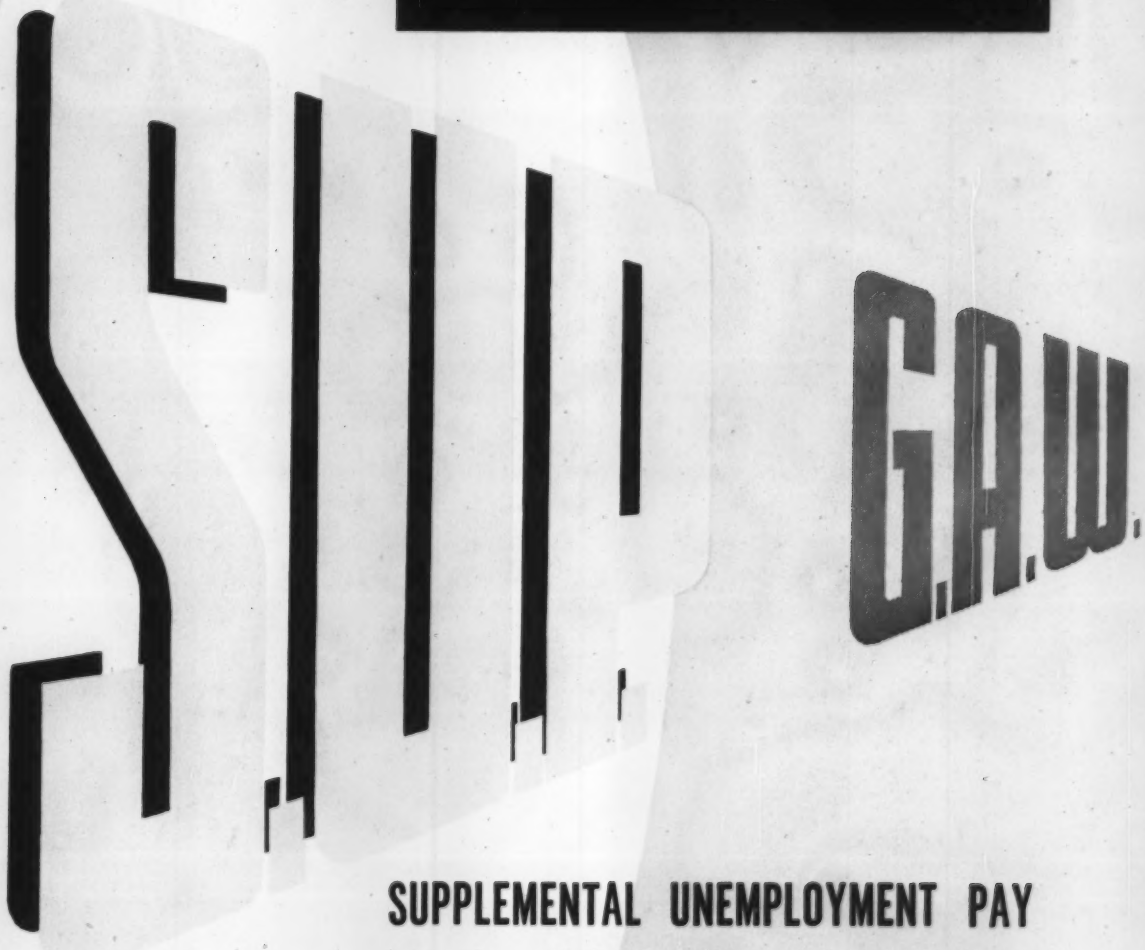
AUGUST 8, 1955

STEEL
The Metalworking Weekly



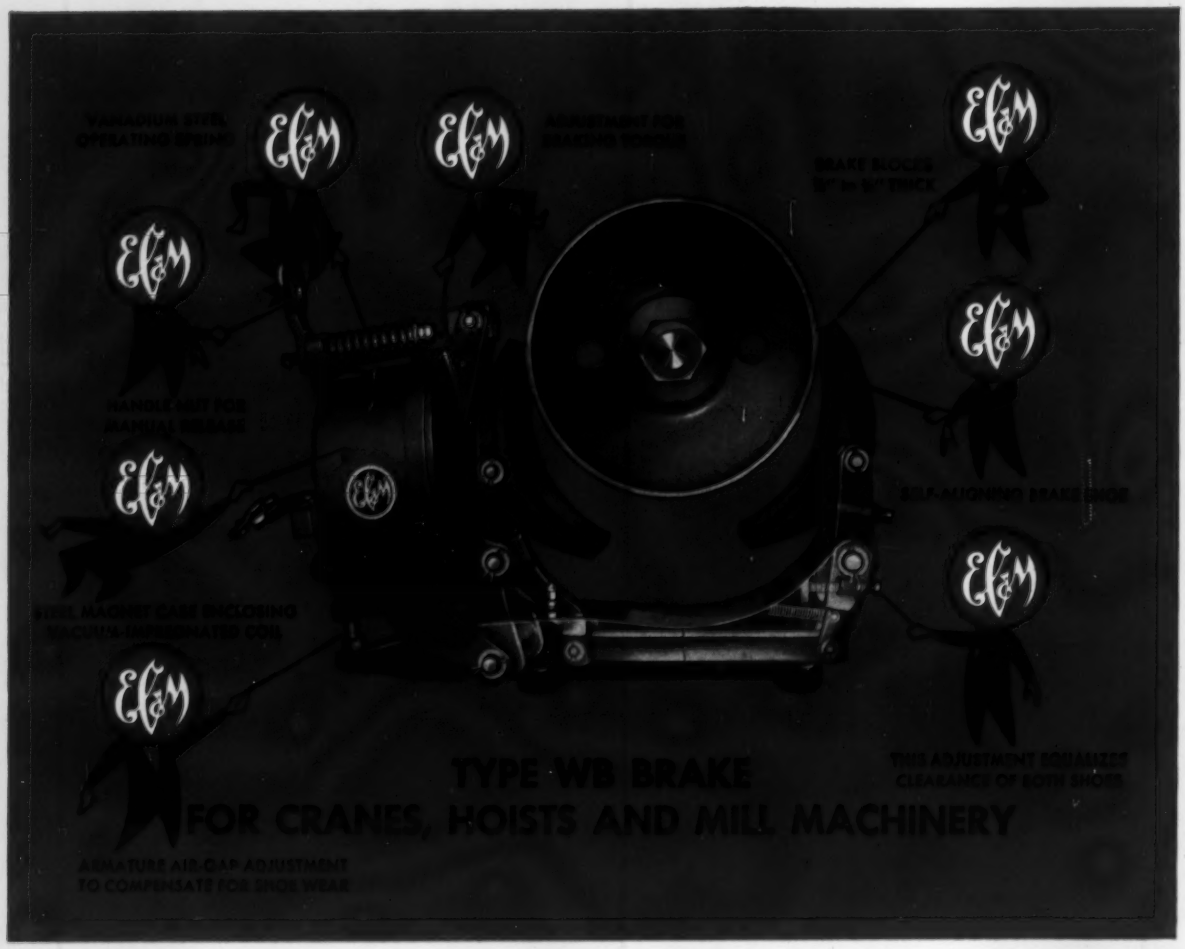
SUPPLEMENTAL UNEMPLOYMENT PAY

takes the spotlight from the annual wage, but even SUP is proving a decoy in many parleys page 37

✔ HEAT TREATING STAINLESS STEELS . . . page 70

✔ FAST-GROWING FASTENER . . . page 115

EC&M brakes are built for smoother operation • safer stops • less maintenance



Take a close look at the world's finest heavy-duty brake. Built for both alternating and direct current motors . . . Type WB Brakes are available in 7 sizes for D-c and 4 sizes for A-c operation.

EC&M has combined the finest materials and workmanship with years of experience and engineering research to assure trouble-free service. When you need a brake that is "performance proven" . . . a unit that provides smoother operation, safer stops and less maintenance . . . specify EC&M Type WB Brakes.

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WELDING STEEL PLATES FOR WATER-SUPPLY FITTING—This huge "Y," being welded from Bethlehem plates, is a typical example of a welded structure in which the fabricator's prime responsibility is making a sound weld. Bethlehem plates are uniform in quality, so that with good welding practice, sound welds are assured. Bethlehem plates come in a full range of sheared and universal mill sizes. Just write or phone the nearest Bethlehem district sales office for complete information.

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Monarch Whyte Strand wire rope is available PREformed and Internally Lubricated, in Lang Lay, Regular Lay, and with Independent Wire Rope Core or Fiber Core. Ropes are made of Bright Steel, Galvanized Steel, Stainless Steel, and Monel Metal, and are supplied properly lubricated and fabricated to serve well under the severest service conditions. *Catalog G-16 is available.*

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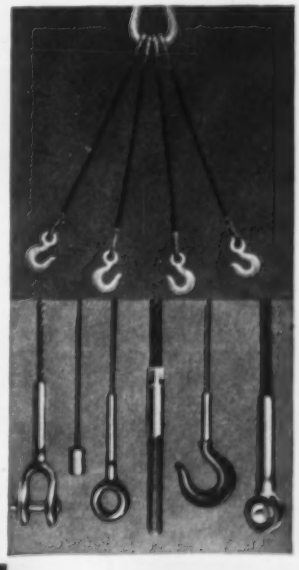

Wire Rope Assemblies Many Safe-Lock wire rope assemblies are made in a wide range of sizes for machine parts, controls, and operating devices. Assemblies provide a unit of wire rope or aircraft control cable with permanently attached fittings made to specified length, size, load capacity. Assemblies are made to both industrial and aircraft standards. *Ask for Catalog 5201.*

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Recommendations on request

11 TIMES THE SERVICE

Steel mill was using rag roll as pinch roll on a shear unit. It lasted about three months on the job. Oil, heat, cutting and pressure contributing toward short life.

The G.T.M.—Goodyear Technical Man—recommended using a rubber-covered roll, specified compound and thickness to be used in covering the roll. This roll served 33 months—*11 times the service at a slightly lower original cost.*

Why not discuss your roll covering problems—or procurement of complete rolls—with the G.T.M., or write Goodyear, Industrial Products Div., Akron 16, Ohio.

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Continuous Annealing Line	Hold-down	Carrying
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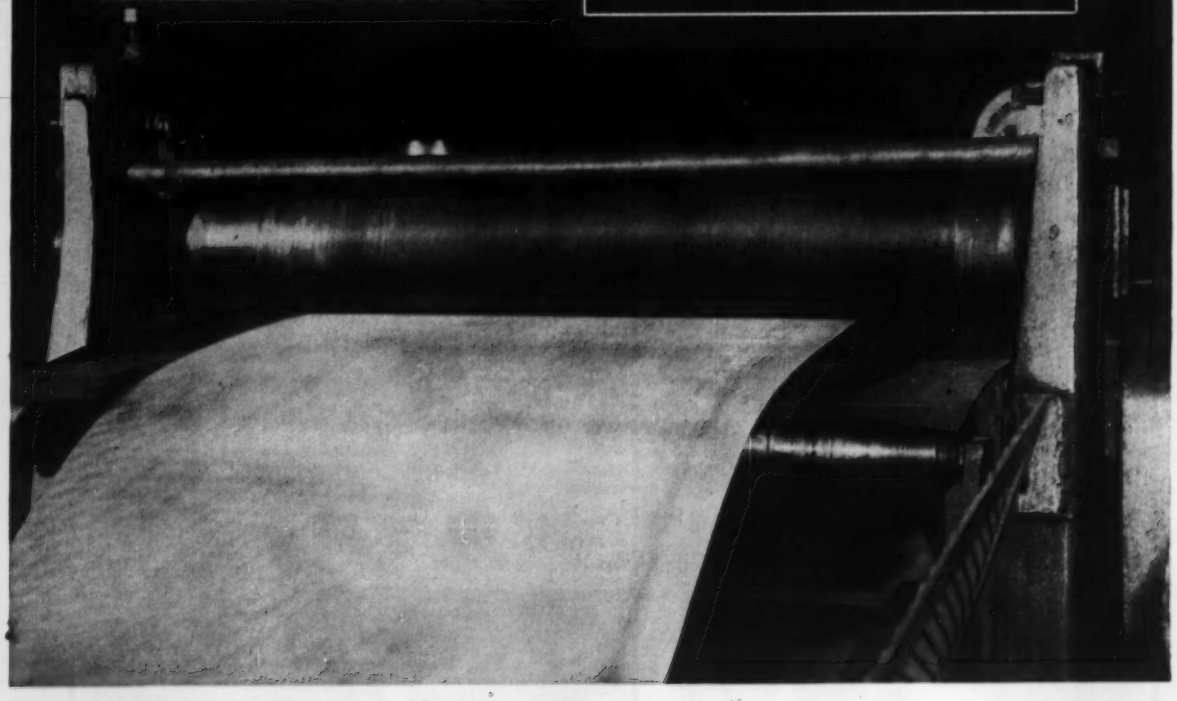

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STEEL
The Metalworking Weekly

AUGUST 8, 1955
Vol. 137 No. 6

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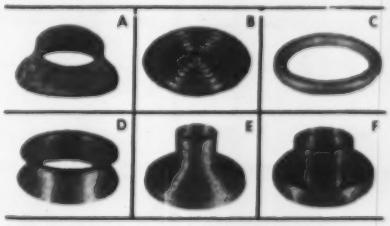
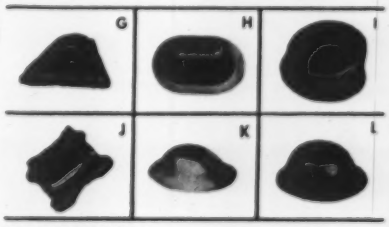


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.



HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

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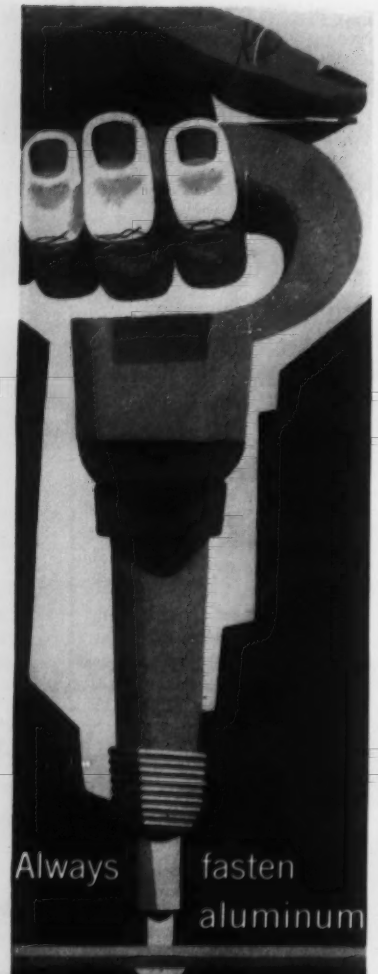

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behind the scenes

Smuggled Interview

Now that Editor Irwin Such has returned from an industrial tour of Western Europe he finds himself looking for a watch with rubber hands, because he is obliged to stretch his time to handle the barrage of questions thrown at him. In coming issues, STEEL will publish his reports on European industry, particularly that of Western Germany.

During his whirlwind 46-day pilgrimage, Irwin interviewed management personnel; visited plants, factories, embassies and military bases; wined and dined with assorted VIPs; maintained a flow of dramatic correspondence with the home office; and made notes on a store of impressions sufficient in volume to replace Dr. Elliot's 5-ft shelf of books (or shelf of 5-ft books; or book of 5-ft shelves). By the way, what became of Dr. Elliot and his five feet?

Because Irwin had so recently observed and remarked on so many interesting business angles in Europe, we figured we would treat our patient readers to a little advance information on his findings by smuggling out an interview. What's the pitch on investment capital and working capital? How about unions, business lobbyists, restrictive legislation, industrial public relations, taxes—and all the mad, crazy things that make business the world's most fascinating game.

No Place Like Home

"There's only one television channel in England," said Irwin, "and everybody is waiting until Sept. 22, when commercial TV makes its bow. Maybe we have a right to complain about our own TV shows, but I don't know: I saw some televised cricket. The great TEST was on; it concerned England and South Africa, and they played from 11:30 a.m. to 6:30 p.m. every day, with time out for tea. I think they are playing yet. People in England were more interested in the TEST than they were in the Geneva Conference. It took three days to play one game, or maybe it took three days to get one side out."

We murmured something about the employment of Mau-Maus as utility slipfielders to strengthen the South African team, but Irwin flipped over to the continent.

"We traveled over much of Germany in a Mercedes 180-D," he said. "This 4-cylinder, diesel-powered automobile was assigned to us by the Daimler-Benz people, and I want to tell you it was a real little bearcat. Only a 40-hp job, it hit 70 mph easily, and burned about 1 gallon of diesel fuel in 33 miles of driving. Speaking of German cars, we were present at tests of other Daimler-Benz units: The jeep-like UNIMOG and the UNIMOG S, a new military truck and personnel carrier. Believe me, they are competition for any manufacturer."

Irwin called at several embassies, but when he arrived at the palace where Clare Booth Luce does business, the Madame Ambassador was out shopping, or getting her hair done. He was impressed by the lavish appointments of her offices. All the American embassies he visited were manned by persons whom he considered polite, friendly, helpful and remarkably efficient. His final conclusions were: There is no place like America, and all the things said about it in patriotic slogans are true, and that it was nice to be home.

Heft That Sphere

As you all guessed, the lady wrote: "Let's get out of this dump; the bellhop is a creep"; the bellhop wrote: "He might be a creep, madam, but he ain't dumb." Many of our readers like cryptograms. We'll have more later.

Here's a simple one that involves research and cipherin'. A 1-in. hole drilled through a plastic sphere is large enough to contain exactly 5 lb of mercury. The plastic weighs one-third as much as mercury. What was the weight of the sphere before it was drilled?

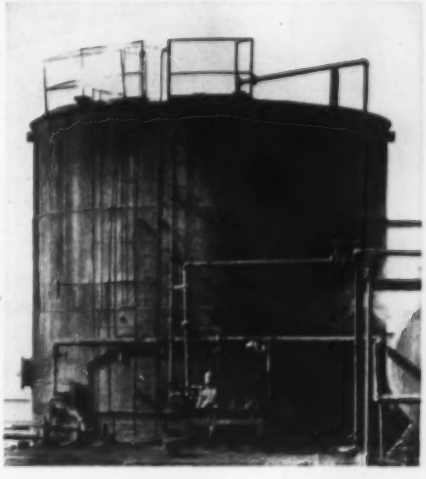
Shrdlu

(Metalworking Outlook—Page 31)

12 Years in a Steam bath!

That tank has been standing near that coke quenching station for twelve years, and it has had the same INSUL-MASTIC coating on it all that time. . . . No, we're not thinking of re-coating it. That INSUL-MASTIC will probably prevent corrosion for several more years. . . . You should see some painted tanks nearby, though. It seems like they're always being painted.

The steam from that coke quencher can be plenty rough on this equipment, but we've found that a thick coating of INSUL-MASTIC just isn't noticeably affected by such atmosphere. The heavily reinforced asphalt and Gilsonite base sheds acid and alkali vapors indefinitely. . . . Yes, for preventing corrosion in your plant or mill, be sure to specify INSUL-MASTIC. . . . Of course, we have our coating work done by a licensed INSUL-MASTIC applicator. They're experienced and dependable.



Here's the INSUL-MASTIC coated tank that has stood twelve years of coke quenching vapors in a northern steel mill.

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Think first of the coatings that last!

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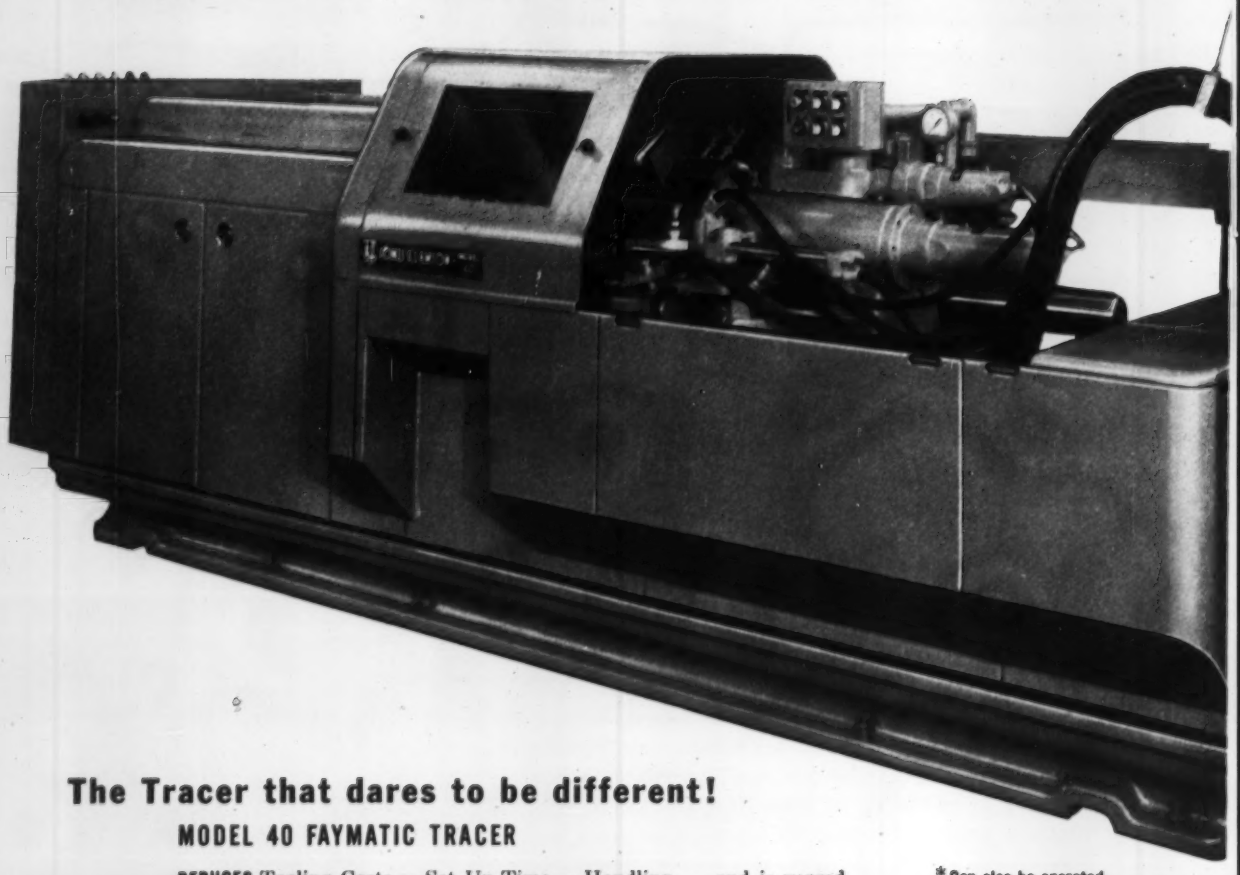
A HEAVY DUTY automatic sequential* TRACING LATHE . . .



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Distance between centers	36″	60″	96″
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CAPACITIES FOR BACK ARM

Maximum Radial Facing Cut — 3¾″

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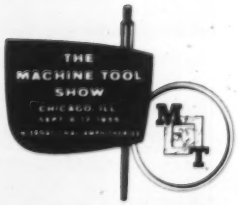
- ✓ Heavy Duty Headstock — 16 spindle speeds (through pick-off change gears) with automatic 2 to 1 or 2½ to 1 speed change under cut.
- ✓ Feed and speed changes occur automatically during a cut, insuring optimum cutting speeds on changing diameters and angles, as well as permitting roughing at one speed and finishing at another.
- ✓ Four hydraulic flow control valves and three control drums operating electrical limit switches comprise the entire set-up for a great variety of combination cuts, feeds and speeds.
- ✓ Hydraulic power is an enclosed compact unit — an integral part of the machine. Electrical controls are grouped in one enclosure.
- ✓ 40 H. P. Motor



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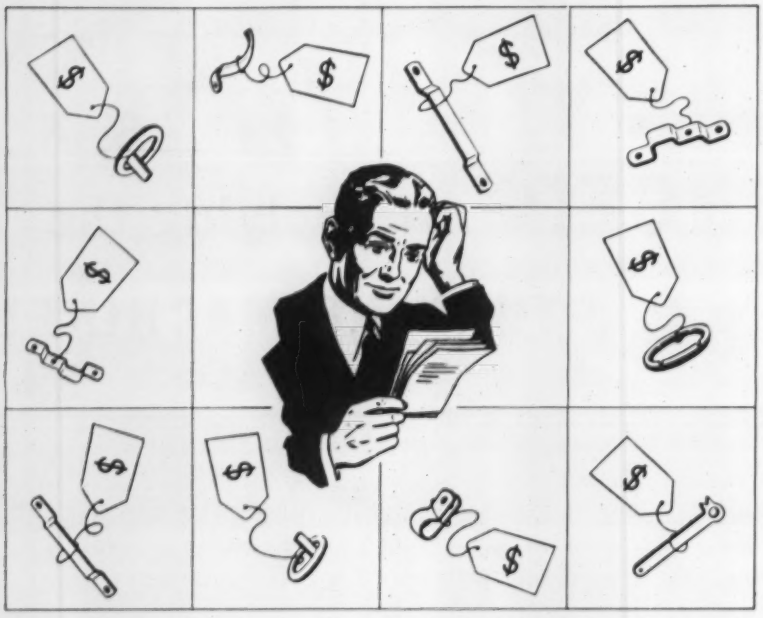

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LETTERS
TO THE EDITORS

House Delivery

Referring to your article, "Do You Fit in Prefab Picture?" (July 11, page 55), can you furnish a list of prefab home builders which deliver in this locality?

Eugene J. Porter
Advertising Manager
Simonds Saw & Steel Co.
Fitchburg, Mass.

• *We suggest you write the Prefabricated Home Manufacturers Institute, 908 20th St., Washington 6, D. C.*

"Price Fighting" Fans

I read with interest your article, "What Cost Price Fighting?" (July 25, page 41), and find it to be true generally.

I believe price cutting is initiated by the buyer, not the seller. The large corporations are strictly price conscious and through their methods of purchasing have created the situations which you so concisely brought forth.

The situation makes for real tough operating.

W. T. Sause
President
Fordees Corp.
Leetonia, O.

This article is timely and well pointed to a situation that seems to be spreading throughout all types of industries.

It is an excellent article for interdepartmental analysis as an explanation why we maintain our pricing policy. We only hope our competitors can be made aware of the situation through articles such as yours.

Anthony Maladra
Assistant Sales Manager
KSM Products Inc.
Merchantville, N. J.

We look forward to receiving our 2300 copies as soon as possible.

Donald H. Workman
Executive Vice President
Gray Iron Founders' Society
Cleveland

It is our intention to place this article in the hands of our salesmen, hoping they will be as stimulated by the article as we have been.

R. H. Fitzsimmons
District Sales Manager
McInnes Steel Co.
Cleveland

I have read this story with a great deal of interest, and I honestly feel you have hit the jack pot. The subject matter is so close to our hearts that I would like 1000 reprints. It is my

(Please turn to page 12)

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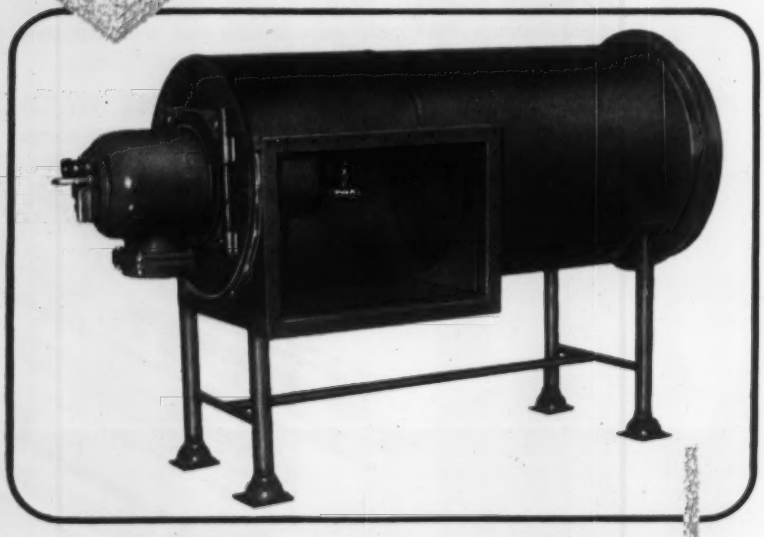
THERMAL TYPE CA DIRECT FIRED AIR HEATERS



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Readily fitted to ovens, kilns, spray dryers, etc., the THERMAL Type CA Air Heater is an ideal source of heat where products of combustion may be mixed with the air. Oil, gas or combination firing is available without change in heater construction.

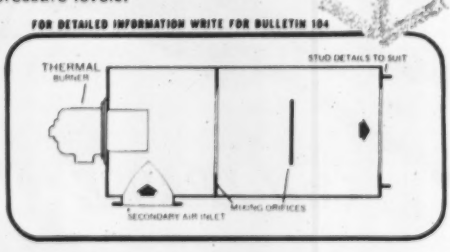
NO REFRACTORY REQUIRED . . .

The THERMAL High Velocity Burner built into the heater permits combustion to be substantially completed within the burner itself. Thus the heater is basically a mixing chamber wherein the products of combustion are mixed with the air being heated. Refractory is not normally used. Successful applications have been made ranging from under 200,000 BTU/hr. to over 20,000,000 BTU/hr. and at all pressure levels.

FOR DETAILED INFORMATION WRITE FOR BULLETIN 104

UNITIZED CONSTRUCTION

Initial cost and upkeep is kept at a minimum through the use of all welded, all metal construction. The CA Air Heaters are normally supplied as complete "package" installations.



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REPRESENTATIVES IN PRINCIPAL CITIES

LETTERS

(Concluded from page 10)

intent to distribute this information widely within our organization and to our distributors.

A. S. Rairden
General Wire Rope Sales Manager
Wickwire Spencer Steel Division
Colorado Fuel & Iron Corp.
Palmer, Mass.

I truly believe it to be one of the best articles I have read. I would like to mail copies of this to my customers.

William A. Mitchell
President and Treasurer
Mitchell Rolled Products Co.
Chicago

I think the article is timely and it certainly concurs with an opinion I have had for some time.

I greatly enjoy the manner in which your magazine is written and look forward to each issue.

F. W. Rickard
President
Mechanics Universal Joint Division
Borg-Warner Corp.
Rockford, Ill.

Sensing Gases

In the July 4 issue on page 67 (Technical Outlook column), you tell about a fountain-pen-sized indicator for sensing explosive gases. Who makes this device?

R. K. Boland
Arkay Co.
Rochester, Minn.

• *Named the Page Sensor Pocket Model Explosive Gas Indicator, it is distributed in the East by the Davis Emergency Equipment Co., 47 Halleck St., Newark, N. J. The Hogart Engineering Co. of Los Angeles developed it.*

Aid to Salesmen

Starting on page 110 of your June 20 issue, you have an interesting article, "Save on Snagging." If available, we would appreciate 20 copies for distribution to our sales offices. We are definitely interested in this information.

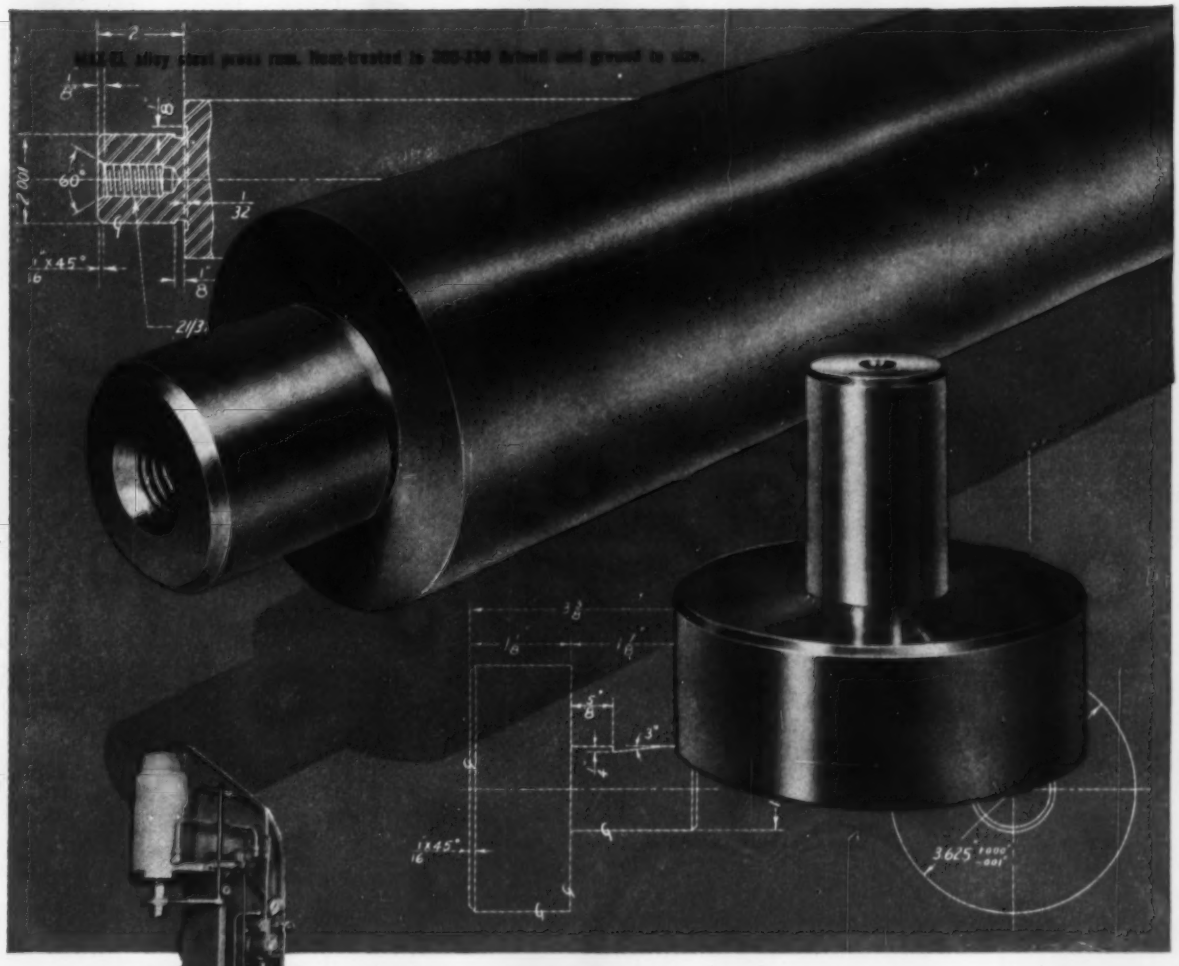
W. A. Ferguson
Standard Electrical Tool Co.
Cincinnati

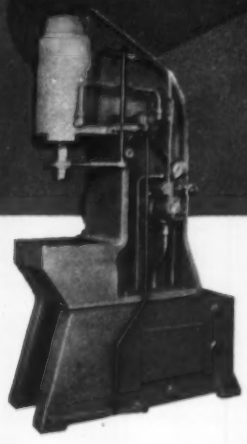
Lubricant Conscious

We are interested in learning more about the lubricant, Acrawax C Atomized, mentioned in the Technical Outlook column of July 11 (page 87).

R. F. Jacobs
Project Engineer
Federal-Mogul Corp.
Detroit

• *For information and free samples, write to Glyco Products Inc., Empire State Bldg., New York 1, N. Y.*





MAX-EL Alloy Steel means no distortion—longer wear in 15-ton hydraulic press ram

To keep this 15-ton press operating day after day for years of dependable service, takes *special* steels. For example, even after thousands of cycles of operation, the ram *must* remain accurately in line with the work table. *It demands a steel that will not distort, set or wear.*

That's why both the ram and ram-plug are made of Crucible MAX-EL alloy steel. In fact, the manufacturer, Greenerd Arbor Press Co., Nashua, N. H., has been a steady user of MAX-EL for many years.

Here's what they have to say—*"We have tried many grades of steel, but we find that MAX-EL 3½ heat-treated in the bar works out better for our application."*

And it probably will for yours, too. So when you have a job calling for a non-deforming alloy steel—one with excellent machinability, high-strength and wear-resistance—try Crucible MAX-EL. It's promptly available from your nearby Crucible warehouse, in the sizes and grades you need. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

Write for your free copy of this Crucible Publication Catalog listing dozens of helpful booklets and data sheets.

Visit us at Booths 830-832 Production Engineering Show, September 6-16, Navy Pier, Chicago.

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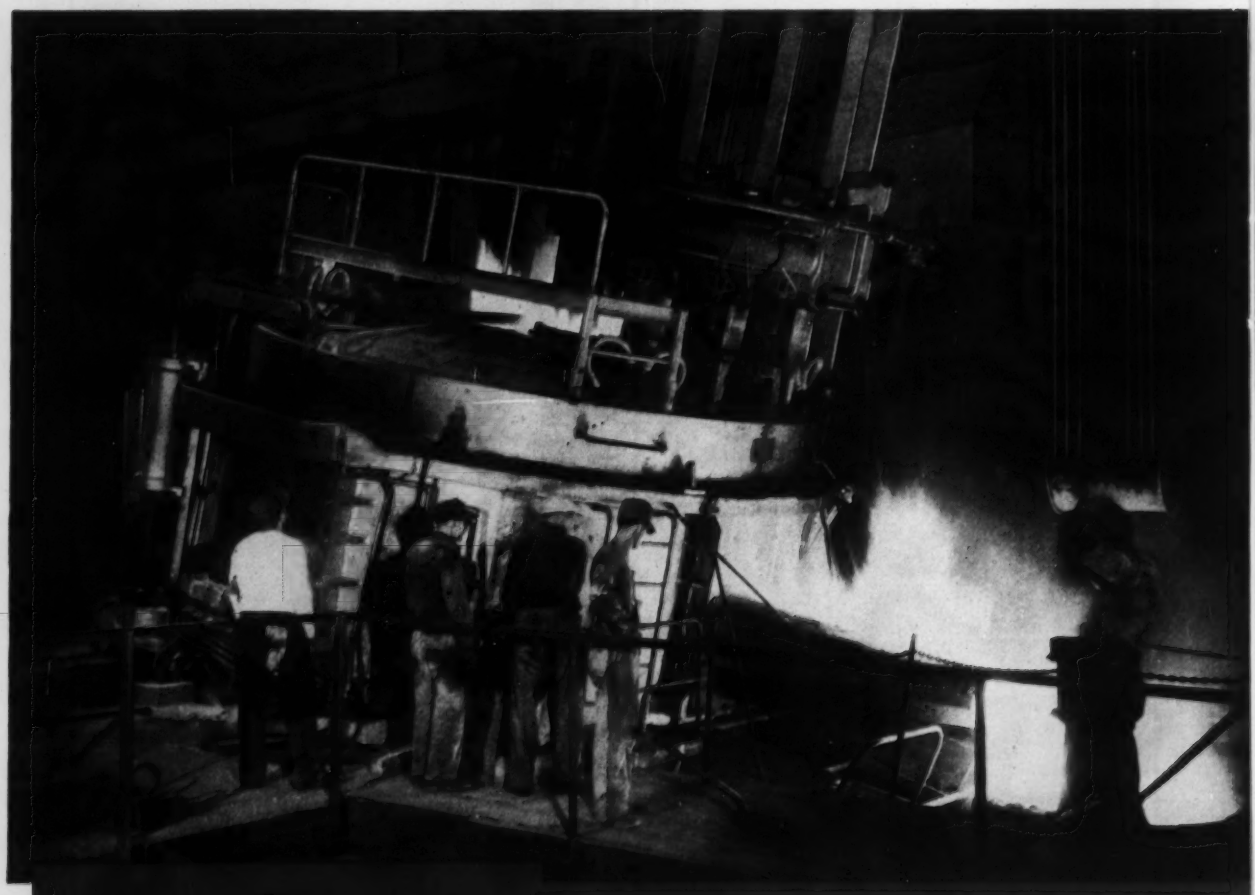
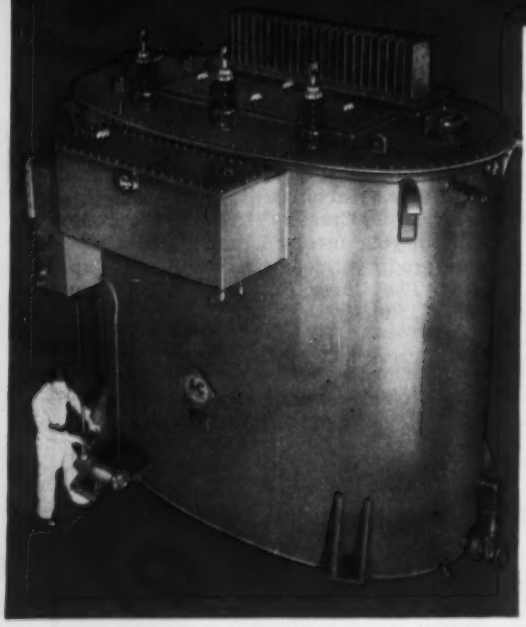




TRANSFORMERS

Well-balanced design and extra-heavy duty construction are used in the Allis-Chalmers arc-furnace transformer. Past records show ability to withstand as much as 25 to 30 years of the repeated daily short circuits encountered in furnace operation. Extremely heavy supports and structure are used to brace coils against the severe short-circuit stresses.

Skillful insulation techniques protect windings from overvoltage due to wide tap range. Some units are designed for as much as 50% range in secondary voltages. Tap-changing mechanism, specially designed for arc-furnace transformers, is in separate compartment to facilitate maintenance. Wide flat contacts provide the long life needed for numerous daily tap-changing operations.

ALLIS-

STEEL

Arc-Furnace Steel

Use Allis-Chalmers Integrated Electrical Equipment—and you...

SAVE on Engineering — Allis-Chalmers steel mill specialists coordinate equipment, submit single complete package proposal.

SAVE on Purchasing — One order, one invoice, one follow-up for the complete furnace electrical system.

SAVE on Installation — All components are matched for easy installation. Delivery is coordinated to prevent delays.

SAVE in Operation — All equipment is designed and built to work together. One reliable supplier guarantees performance of complete electrical system.

TAKE ADVANTAGE of Allis-Chalmers complete line of arc-furnace equipment—transformers, *Regulex* control, switchgear, associated controls—backed by 45 years of experience. Call your nearby Allis-Chalmers District Office for assistance when you are planning new facilities or modernization. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

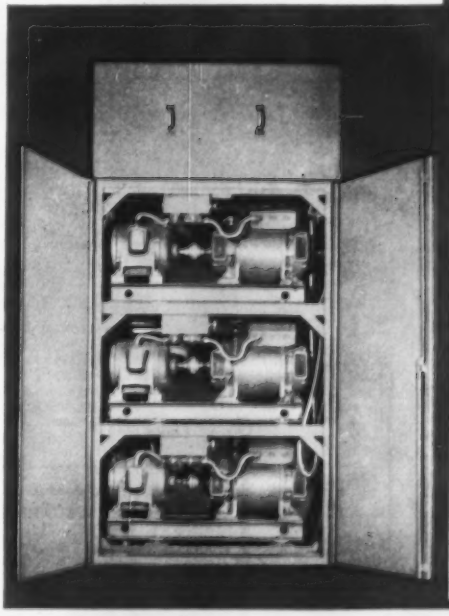
Regulex and *Ruptair* are Allis-Chalmers trademarks. A-4742

REGULEX CONTROL

Balances arc current with arc voltage almost instantly—maintains desired arc conditions by automatically varying distance between electrode and charge.

With *Regulex* rotating amplifier there are no contacts or switching devices between the regulator and electrode motor. Continuously closed circuit provides constant positive control, minimizing current surges, cutting power consumption.

Simple design of *Regulex* results in lower maintenance. Provisions for spare unit mounted on top assure continuous operation under all conditions. Tier construction — open or enclosed —conserves valuable floor space.



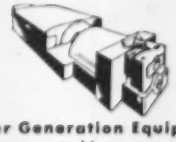
Other Allis-Chalmers Equipment for the Steel Industry

Wide Range of Motors for main mill and auxiliary equipment drives—ac or dc—from 1 hp to 10,000 hp—and supporting m-g sets or rectifiers.

Transformers for mill service include metering transformers, distribution transformers, power transformers, and unit substations.

Switchgear ranges from low voltage metal-enclosed units to large metal-clad types — includes *Ruptair* and oil circuit breakers. Also large power circuit breakers.

Blast Furnace Blowers are a part of the A-C line of single and multi-stage blowers, axial and rotary compressors, and vacuum pumps for the steel industry.



Power Generation Equipment includes steam turbine-generator units 2000 kw and larger for fluctuating steel mill loads. Also condensers, pumps and auxiliary-drive motors.

CHALMERS

A-C ALLIS-CHALMERS

making a
MARKED IMPROVEMENT
in PARTS IDENTIFICATION

Typical of the parts identification marking problems Markem solves is this one involving metal tail pipes. In place of costly, wrap-around paper labels that wouldn't stick, the manufacturer now prints complete label detail on pressure-sensitive tape, using a Markem 26A machine. Imprints are neat and clear—tape stays on. If identifying, decorating or designating a product, part or package is your problem, let Markem help you. Since 1911, Markem machines, type and ink have helped industry make its mark—better. They can do the same for you. Just write Markem Machine Company, Keene 30, New Hampshire.

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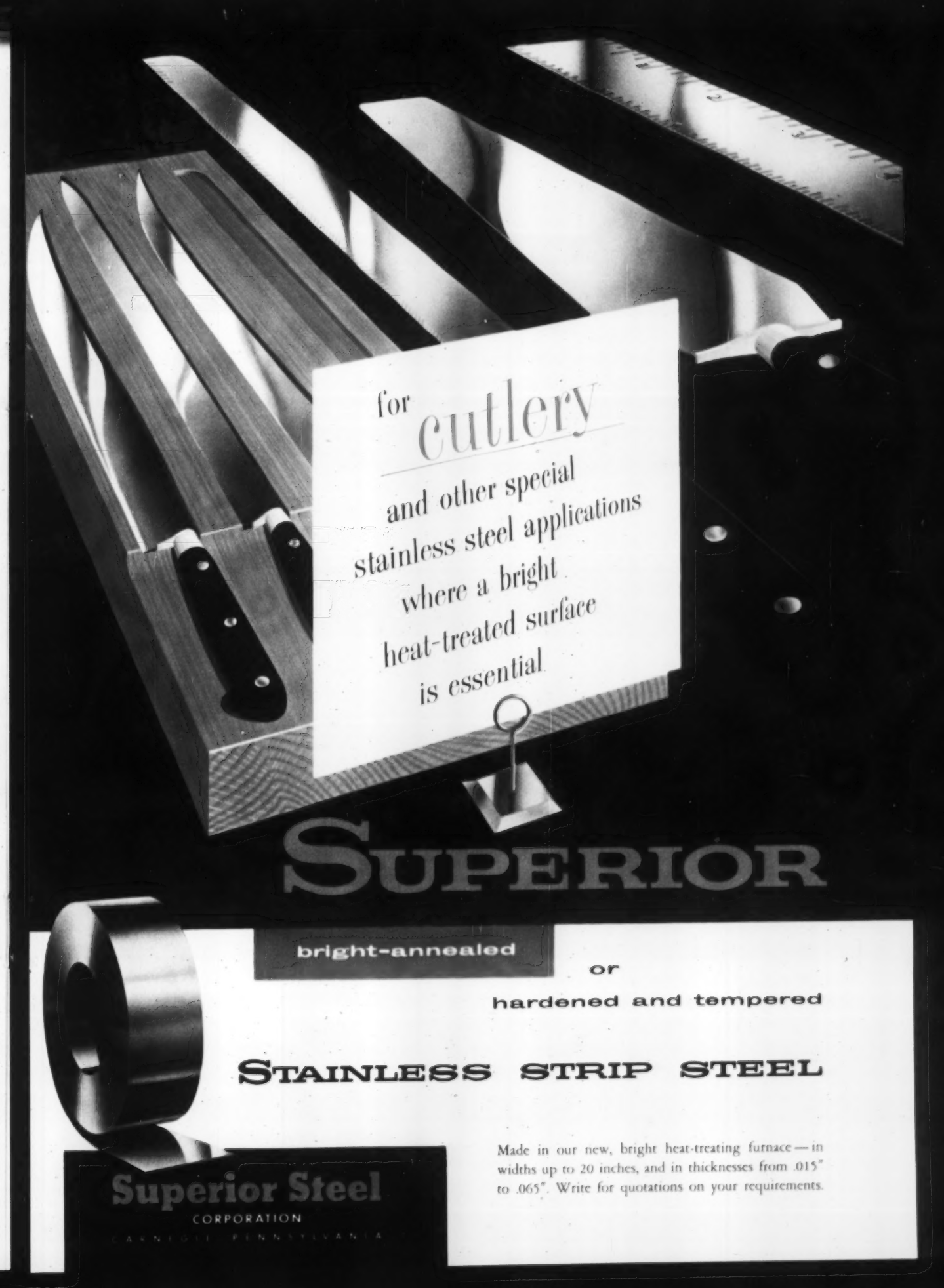
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STAINLESS STRIP STEEL
Made in our new, bright heat-treating furnace — in widths up to 20 inches, and in thicknesses from .015" to .065". Write for quotations on your requirements.
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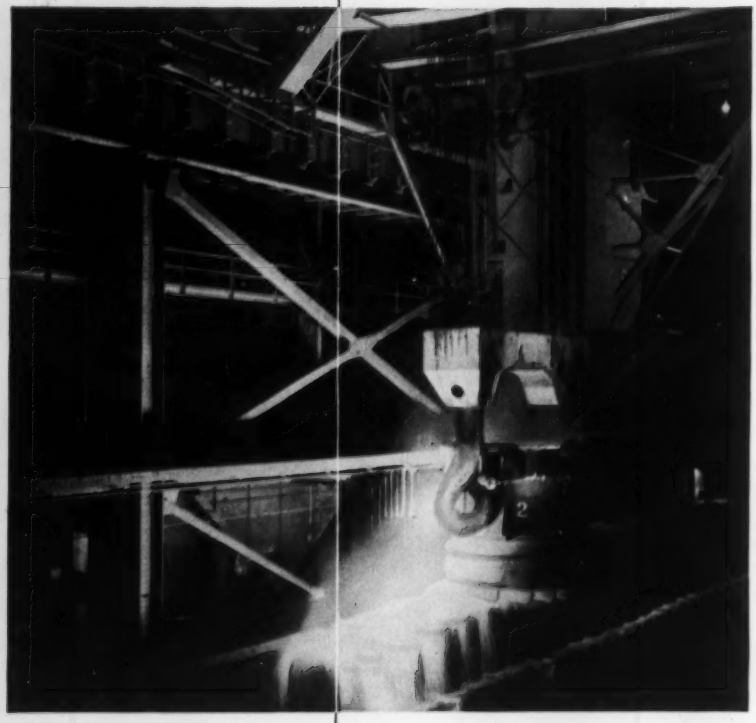
Morgan cranes stop "on a dime"

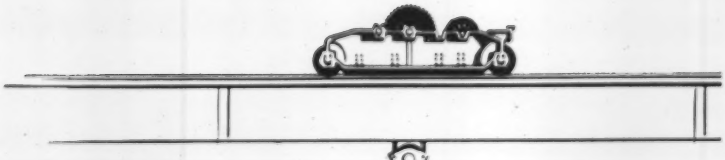
● BRAKING a Morgan crane under full load is as easy as stopping the family car.

Morgan hydraulic crane brakes provide maximum safety and pin-point accuracy in spotting heavy loads . . . another vital link in the chain of features that makes Morgan cranes best in the business.

Performance records prove that advanced design and heavy-duty construction of Morgan cranes make them less costly to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!

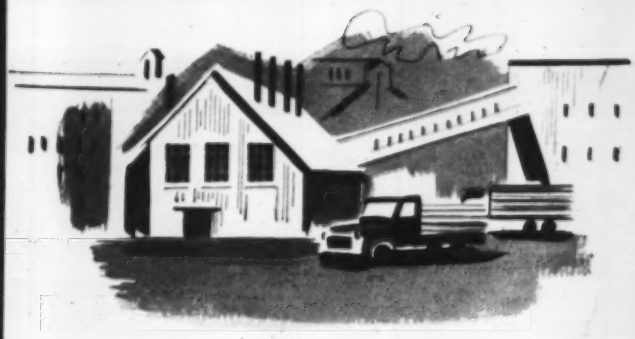


Positive action encourages operators to use the hydraulic brake rather than plug the motor.



The Morgan Engineering Company manufactures overhead electric traveling cranes, gantry cranes, charging machines, plate mills, blooming mills, structural mills, shears and saws.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*



WEIRTON

GALVANIZED SHEETS

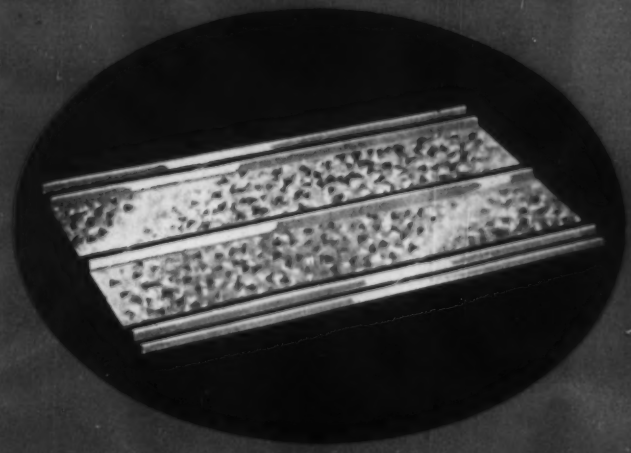
for long-lived roofing and siding

There's an easy way to solve roofing and siding problems quickly, dependably, economically. That's the Weirton way—with Weirton galvanized steel sheets. Their tight zinc coating resists cracking, peeling and flaking. The strength of steel plus the corrosion resistance of zinc gives added years of life. And long experience shows that galvanized sheets give more protection, with less maintenance and at lower cost.

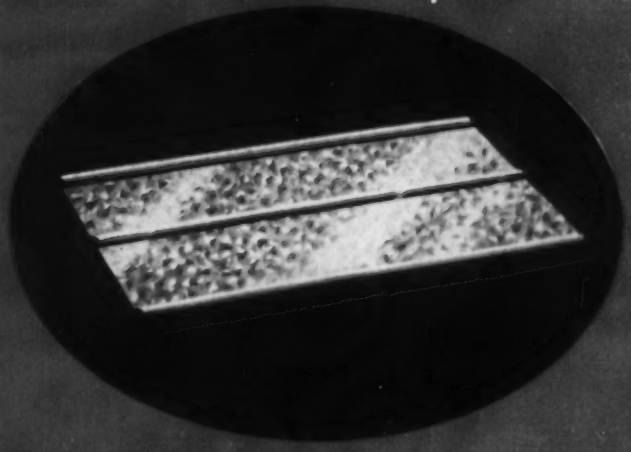
Weirton's modern production processes, plus close quality control all along the line, make Weirton galvanized sheets a best buy for your roofing and siding needs.

WEIRTON STEEL COMPANY
Weirton, West Virginia

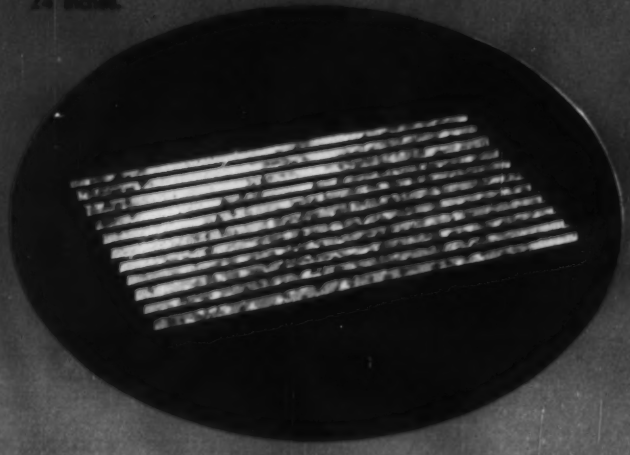
NATIONAL STEEL CORPORATION



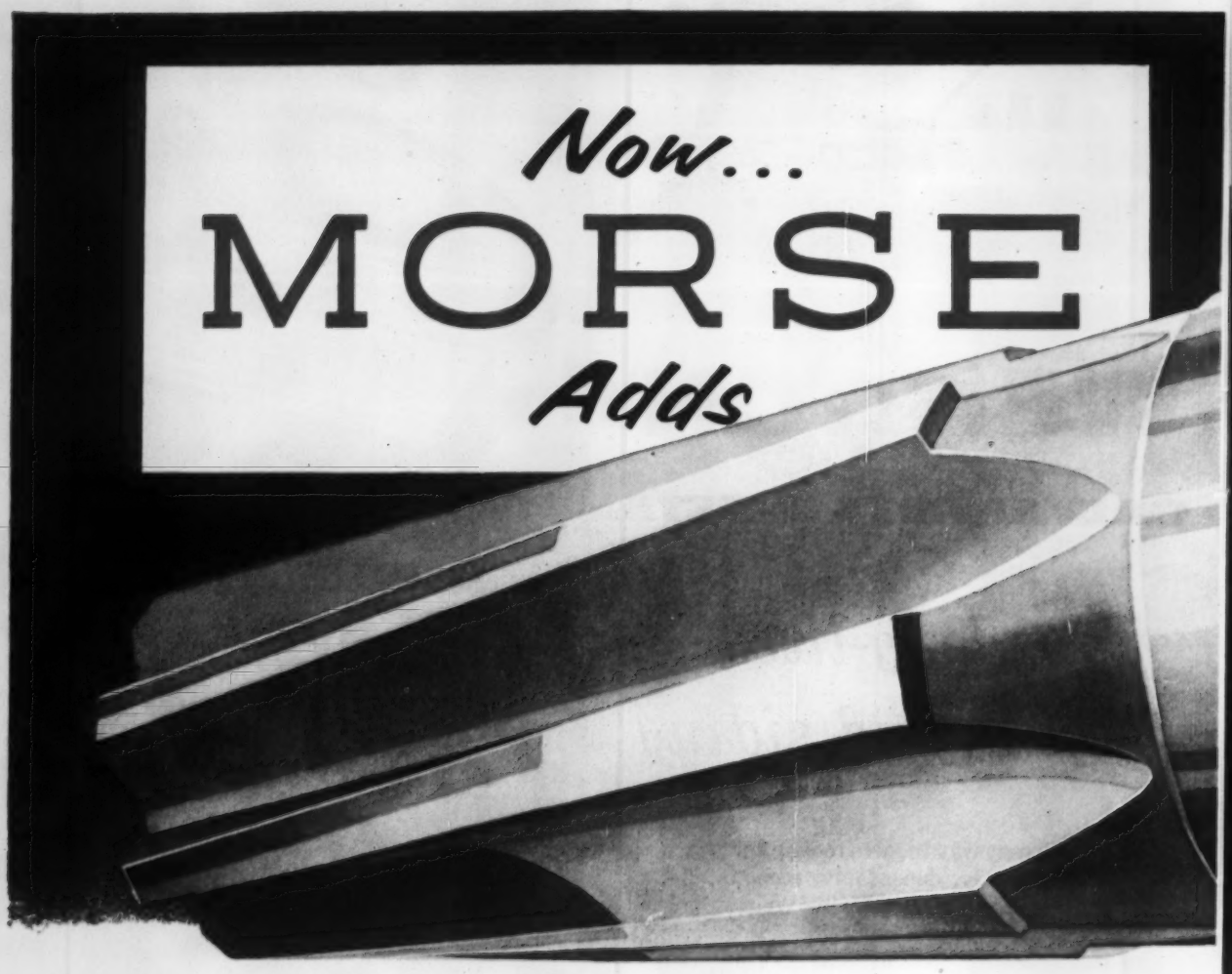
Famous Weirton "Safety Drain" galvanized steel sheets combine maximum protection with outstanding good looks.



Weirton galvanized V-Crimp sheets are made in 2V-, 3V-, and 5V-crimped, and in gauges 26, 28 and 29; covering width, 24 inches.



Weirton galvanized corrugated steel sheets are most economical in first cost, and are the strongest form of steel roofing because the corrugations strengthen the entire sheet.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This complete new line of Morse Tungsten Carbide Tools . . . both tipped and solid . . . conforms to Morse standards of quality and precision and is backed by years of experience in Carbide tooling. And, it will be available from your only source of Morse-cost-cutting tools . . . your Morse-Franchised Distributor.

So call him *now* . . . get the whole story in detail. It's the most interesting news that anyone in industry has heard since Stephen Morse invented the twist drill!

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Now...

MORSE

means

"THE MOST"

in Cutting Tools

There's nothing unique

. . . about punched cards

Collecting market data on punched cards is not unusual today.

Using these cards as we do to match industrial publication coverage to the number of worthwhile establishments *is* unusual.

Reporting coverage figures to advertisers on the Standard Industrial Classification* (S.I.C.) basis was distinctly a PENTON development. We are glad to see that more and more publishers are swinging over to this modern method of circulation analysis.

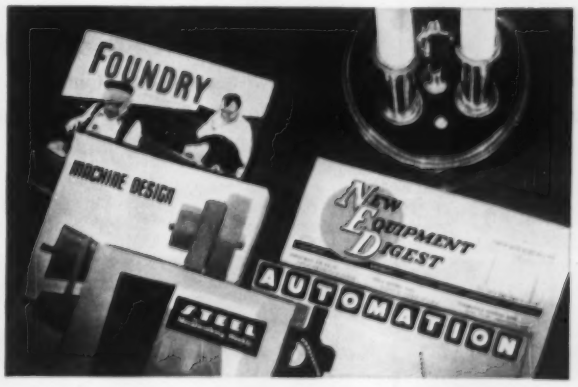
Plant counts will some day be required from all industrial publishers. Many progressive media buyers request them now. Without this information the advertiser is "flying blind" because he has no means of checking the number of worthwhile units covered (or missed) by a business magazine.

When you're using a PENTON publication you know how many worthwhile *units* are reached. Coverage reported on the S.I.C. basis enables you to measure it in relation to the total number of units. You can evaluate the proportion of the market buying power you are reaching, because information on size or type of establishments is also reported.

The ability to buy coverage in this modern way is just one of the extra values you get *when it's a PENTON publication.*

*All manufacturers use this system in reporting to the U. S. Bureau of the Census.

. . . but there is about the way PENTON uses them



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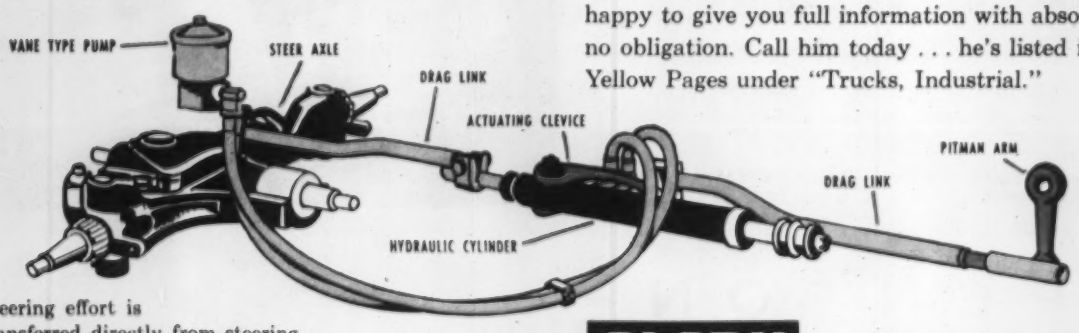
NOW—Standard Equipment on Clark's Yardlift 60 . . . HYDRAULIC STEERING!

Here's money-saving news: Hydraulic Steering is now available as standard equipment on Clark's 6,000-lb. Yardlift 60. Effortless Hydraulic Steering at no extra cost. Less driver fatigue, outstanding maneuverability in tight areas, and more positive control—means *more* work from your equipment.

Get full details on Clark's Yardlift 60 with Hydraulic Steering. Your local Clark dealer will be happy to give you full information with absolutely no obligation. Call him today . . . he's listed in the Yellow Pages under "Trucks, Industrial."



Steering effort is transferred directly from steering column to the hydraulic cylinder through drag link and actuating clevice assembly. Simple and positive design of Clark's Hydraulic Steering means fewer working parts, less maintenance—equipment that stays on the job longer.

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Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 26, Michigan

A BETTER BUY WITH LOCAL SUPPLY—*Genuine Clark Parts*

CALENDAR
OF MEETINGS

Aug. 15-17, Society of Automotive Engineers Inc.: West coast meeting, Multnomah hotel, Portland, Oreg. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Aug. 22-23, Stanford Research Institute and National Industrial Conference Board: Symposium on electronics in automatic production, Sheraton-Palace hotel, San Francisco. Information: National Industrial Conference Board, 247 Park Ave., New York 17, N. Y. Secretary: Herbert Briggs.

Aug. 24-26, West Coast Electronic Manufacturers Association: Western electronic show and convention, Civic Auditorium, San Francisco. Information: WESCON, 344 N. LaBrea Ave., Los Angeles 36, Calif.,

Aug. 28-Sept. 1, National Association of Furniture Manufacturers: Furniture supply fair, Conrad Hilton hotel, Chicago. Association's address: 666 Lake Shore Dr., Chicago 11, Ill. Secretary: John M. Snow.

Aug. 31-Sept. 26, World's Fair of Power: S. Lake Shore Dr. adjacent to Soldiers Field, Chicago. Sponsor: General Motors Corp., General Motors Bldg., Detroit 2, Mich.

Sept. 5-6, American Machine Tool Distributors Association: Annual meeting and show, Blackstone hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 6, Pa. Secretary: Thomas A. Fernley Jr.

Sept. 6-8, Industrial Truck Association: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Association's address: 526 Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Sept. 6-8, Material Handling Institute Inc.: Fall meeting, the Greenbrier, White Sulphur Springs, W. Va. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Sept. 6-17, Metalworking Machinery & Equipment Exposition: Coliseum, Chicago. Information: Exhibition & Convention Management Inc., 2689 E. Overlook Rd., Cleveland 6, O. General Manager: C. L. Wells.

Sept. 6-17, National Machine Tool Show: International Amphitheatre, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 6-17, Production Engineering Show: Navy Pier, Chicago. Sponsor: National Machine Tool Builders' Association, 2071 E. 102nd St., Cleveland 6, O. General Manager: Tell Berna.

Sept. 9-11, Metal Powder Association: Fall closed meeting, the Homestead, Hot Springs, Va. Association's address: 420 Lexington Ave., New York 17, N. Y. Secretary: Robert L. Ziegfeld.

Sept. 11-14, National Metal Trades Association: Eastern plant management conference, Essex and Sussex hotels, Spring Lake, N. J. Association's address: 122 S. Michigan Ave., Chicago 3, Ill. Secretary: C. L. Blatchford.

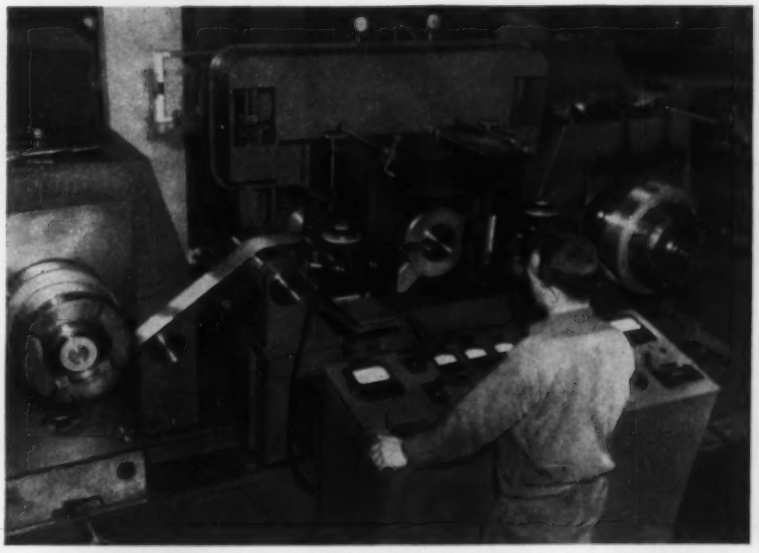
Sept. 11-16, American Chemical Society: Fall meeting, University of Minnesota, Minneapolis. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 12-14, American Road Builders Association: Annual conference of county engineers and officials, New Riverside hotel, Gatlinburg, Tenn. Association's address: World Center Bldg., Washington 6, D. C. Secretary: Eugene Reybold.

Sept. 12-14, Allied Railway Supply Association: Annual meeting and exhibit, Sherman hotel, Chicago. Association's address: P.O. Box 5522, Chicago, Ill. Secretary: Charles F. Well.

Sept. 12-15, Automotive Electric Association: Fall meeting, the Homestead, Hot Springs, Va. Association's address: 16223 Meyers Ave., Detroit 35, Mich. Secretary: S. W. Potter.

Sept. 12-15, Society of Automotive Engineers Inc.: Tractor meeting and production forum, Hotel Schroeder, Milwaukee. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.



TYPICAL OF NEW PRODUCTION EQUIPMENT installed in the Beryllium plant is this Sendzimir cold-rolling mill which handles wider strip faster than previous equipment, while its precision makes possible greater dimensional control and quality of product.

THE NEWS FROM BERYLLIUM IS EXPANSION

New production facilities improve quality, expand size, tighten tolerance range and increase availability of "Berylco" Beryllium Copper

The laboratory stage of beryllium lasted from its discovery in the 1790's until early in the 1930's. The last two decades might be termed the pilot stage, for the value of beryllium and its alloys, particularly beryllium copper, was being proved throughout industry. Indications from large-volume users are that a new era is on hand—the mass-production era. To make this possible, the world's largest producer, The Beryllium Corporation, has just completed a multimillion-dollar plant improvement program as part of an overall expansion plan.

This program encompasses the whole production set-up, from the ball mills that grind ore to the finishing mills. Cold-rolling capacity, for instance, has been multiplied by the installation of new strip mills. New finishing mills not only increase capacity, but make possible closer tolerances and new strip sizes. Sufficient economies have already been realized to warrant price reductions on strip in lighter gages to large volume users. A new extrusion mill supplements existing hot-rolling facilities and provides sizes, shapes and forms not produced heretofore. Thus beryllium copper is now being made available in greater quantities, more numerous forms, and improved quality.

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NEW MARKETING TECHNIQUES ALSO. Leading nonferrous distributors the country over are now carrying a wide stock of beryllium copper products, ready for immediate delivery. Write for the name of the distributor nearest you.

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New induction heater designed for easier conversion

Building-block design of the new Westinghouse 30-kw induction heater permits 32 regular combination for your low-power applications, plus a number of special arrangements. It provides the kind of flexibility and convenience you need to keep abreast of your constantly changing production setups.

Versatile—you get custom-built installation of standardized equipment to handle a wide range of applications. Unit ideal for hardening, annealing, brazing or soldering.

Easy to Use—front of worktable, free of controls, can be used for mounting work-handling equipment. Instruments at eye level for easy readability. M-G set readily accessible without removing panels. Buy the equipment you want, adapt it when your needs change: single to two-station operation—sink to bench top—high-voltage to low-voltage output—grouped as a compact unit to remotely located output stations.

Equipment consists of four basic units: (1) 30-kw, water-cooled, 10,000-cycle M-G set, (2) generator control cabinet, (3) high-frequency output cabinet, (4) work table.

For more information about improving your induction heating operations, call *The Man With The Facts*—your Westinghouse sales engineer. Ask him for your copy of booklet B-6519, or write Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pa. J-02297

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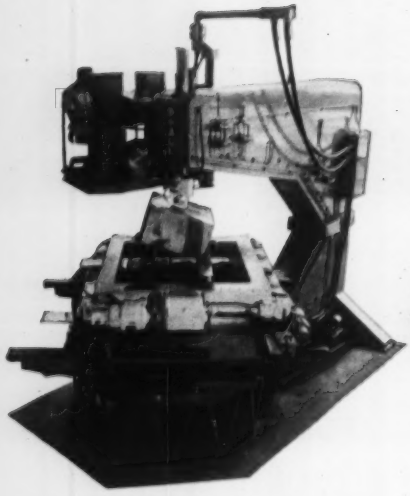

The new giant DoALL Contourmatic band saw — the world's largest — is a key part of the Air Force's "Heavy Press Program." STRESSPROOF is used on important operating parts.

on key operating parts

The lead and feed screws on the new DoALL Contourmatic must be strong since they transmit power. These important lead and feed screws must also be straight and free from growth and shrinkage, since upon their accuracy depends the accuracy of the huge extrusion dies machined on the saw. STRESSPROOF gives them this strength and accuracy.

STRESSPROOF was specified because it eliminates heat treating and its attendant distortion and warpage problems. In addition, STRESSPROOF wears well, has the necessary strength and is easily machined.

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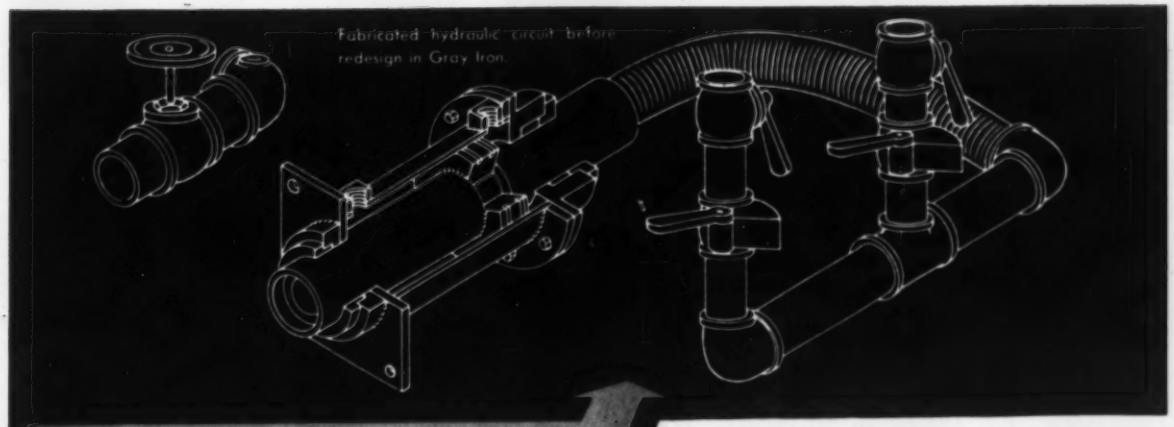
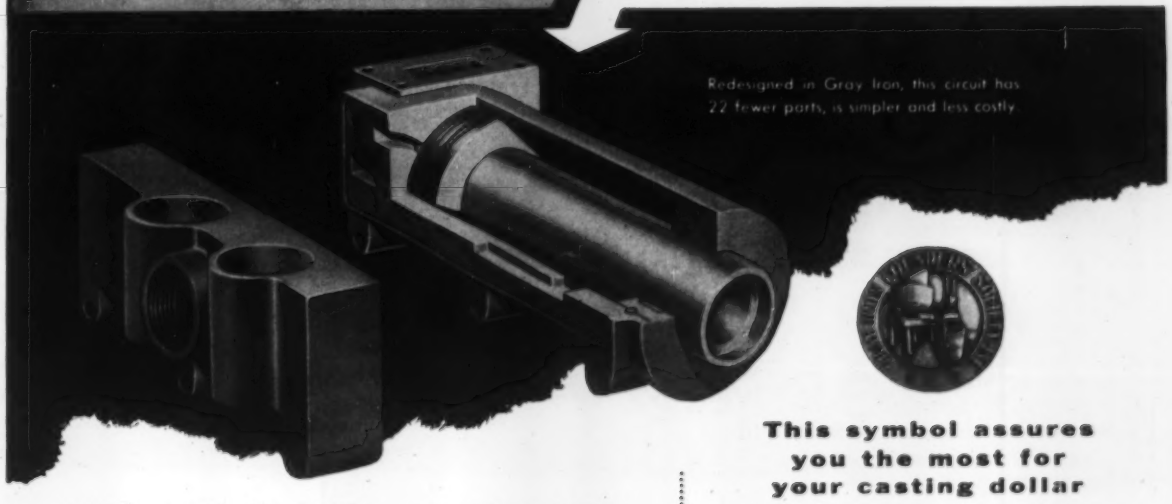


Fabricated = 35 Parts

Cast in Gray Iron = 13 Parts



22 parts have been eliminated from this hydraulic circuit by redesigning in Gray Iron. The cast unit is compact, more efficient and less costly. It has done away with many external connections and all welding and pre-weld preparation formerly required.

Many such important savings are inherent in the Gray Iron casting process as compared with fabricated assemblies. Consider Gray Iron's unique engineering advantages in redesigning your products.

Call your nearest Society member foundry and the full facilities of this association will be available to you. Or, write direct to Gray Iron Founders' Society, Inc., National City-E. 6th Bldg., Cleveland 14, Ohio, for helpful technical and business information.

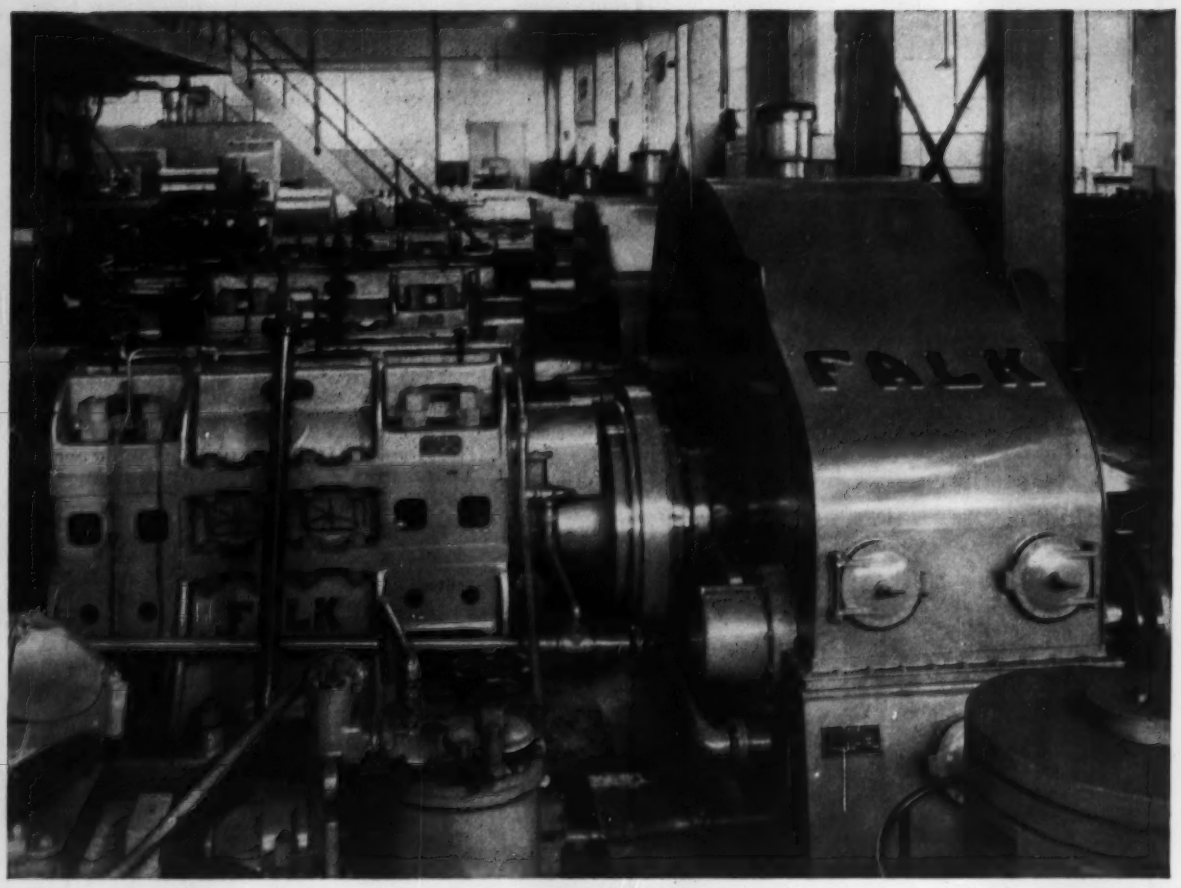
This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

GRAY IRON FOUNDERS' SOCIETY



"Inside Story" of Better Gear Protection—

EXTREME pressures generated in enclosed reduction gear drives and pinion stands call for a lubricant with high EP characteristics — *Texaco Meropa Lubricant.* The EP properties of this fine oil stand up through the severest service, assure smoother, quieter operation, full protection and longer life for gears and bearings... lower maintenance costs.

Texaco Meropa Lubricant is especially resistant to oxidation and thickening. It does not foam... does not separate in service, storage or centrifuging... protects bearings from corrosion.

A Texaco Lubrication Engineer will gladly give you full information. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Meropa Lubricants

FOR STEEL MILL GEAR DRIVES

TUNE IN ... TEXACO STAR THEATER starring JIMMY DURANTE or DONALD O'CONNOR on television ... Saturday nights, NBC.

Metalworking Outlook

Of Things To Come

For a hint of what ideas the United Steelworkers has about a guaranteed wage, watch pending negotiations with American Can Co. and Continental Can Co. The union scoffs at the United Auto Worker settlement for a Supplemental Unemployment Plan. The steel union negotiated on wages only this year with the basic steel and aluminum companies, but it will demand a guarantee from the can firms.

Paradox in Germany

West Germany's steel shortage forces it to import some 220,000 net tons of rolled products a month. Paradoxically, it still is exporting about 170,000 tons of the same class of products monthly. Reasons: Some export commitments were made months ago; in an occasional area, export sales bring a higher return than the domestic market. Germans are importing mainly from France, Belgium and even Austria and Sweden. Look for German ingot output to exceed 22 million net tons this year.

Dealers' Dilemma

The next two or three months will be trying times for auto dealers. They must clear out their 1955 models. Despite record production and sales, unsold stocks are high (they stood at 820,291 on July 1). Dealer mortalities have increased about 200 per cent since 1951. Average dealer operating profits before taxes have dropped from about 6.3 per cent on sales in 1950 to about 0.6 per cent in 1954. The ratios are a little better than 0.6 now, but activity in the next 60 or 90 days won't improve them.

Special Session Unlikely

A special session of Congress to consider a highway measure is unlikely, even though the shelving of the road bill in this session of Congress was a severe blow to the administration. Besides wanting the measure to update our highways, the administration also planned to use extensive road projects as an ace in the hole in case of depression. Because the economy is booming, the White House probably will decide to wait to present the program at a regular session next year.

Politically Sensitive

The politically sensitive subject of small business also will get a big play in the next session of Congress. Small firms received 20.8 per cent of total defense awards in the year ended June 30, 1955, compared with 25.1 per cent in the previous year. The Senate Small Business Committee may recommend that a board of top military and civilian officials be set up to review all items on the preferential planning list to determine which can

be made by small firms . . . The Small Business Administration was extended for two years, with broader loan authority.

Flying Basketballs

The first of the unmanned satellites to be launched by the U.S. may be built at an Army ordnance facility. The spherical "basketballs" will be made of new, highly heat-resistant metals. The program will cost about $10 million, plus the cost of rockets for launching. The project is to be developed by the National Academy of Sciences and the National Science Foundation and financed entirely with government money.

Not Enough Mergers?

Worried about big business and the merger epidemic? Stop now, says Harvard Economist Sumner H. Slichter. In fact, he claims that there are not enough mergers—"many small companies and companies of medium size could advantageously combine." He adds: "The argument that bigness threatens our political liberties is without foundation. Nor is there evidence to support the notion that big firms are able to get a competitive advantage."

Kids' Stuff: $1250 Million Worth

Toy sales in 1955 will reach $1250 million, predicts Opinion Research Corp., a survey firm. Sales last year were $920 million. Marketwise, major toy demand is for children in the two-to-six group. That bracket represents 36 per cent of the child population and receives half the toys.

In the Black for Fiscal 1956

After four years of red ink, a balanced federal budget is in sight for fiscal 1956. That should provide a good climate for stable prices and steady economic growth over the next 11 months. The balance comes because of booming business and the resulting increase in tax collections, plus spending ceilings enforced by the Eisenhower administration. But prospects are that the budget will go back into the red in fiscal 1957 if Congress makes tax cuts that are expected at the next session.

Straws in the Wind

Water enthusiasts will spend more than $150 million this year for 500,000 outboard motors . . . Some 169 contracts worth $59 million were let in the first quarter to fight stream pollution . . . California studies show that wire corrals are better than wooden ones for summer cattle feeding . . . Look for truck-trailer output to hit 70,000 in 1955, compared with 55,417 in 1954 . . . Hotpoint Co. on Aug. 1 increased retail prices on five of its nine major appliances about 3 per cent . . . The U.S. will have a tougher time getting WOCs; the Defense Production Act extension provides that businessmen serving the government without compensation must file a report on their business connections every six months.

Nuts produced by Lamson & Sessions, Cleveland, Ohio.

Get more production with this

SCRAPLESS NUT QUALITY WIRE

Youngstown Scrapless Quality Nut Wire. The wire with the accurate sizing. The right composition. The wire that measures up to chemical and metallurgical checks for analysis. Micro-examinations, too.

Scrapless Quality Nut Wire with these qualities feeds smoothly through your machines. There is less downtime. Fewer rejects. And severe die wear is lessened.

Next time you order Scrapless Quality Nut Wire, be sure you get Youngstown. It's available in a good range of compositions, including AISI Standard as well as special re-sulphurized steels. For more information, call your nearest Youngstown District Sales Office.

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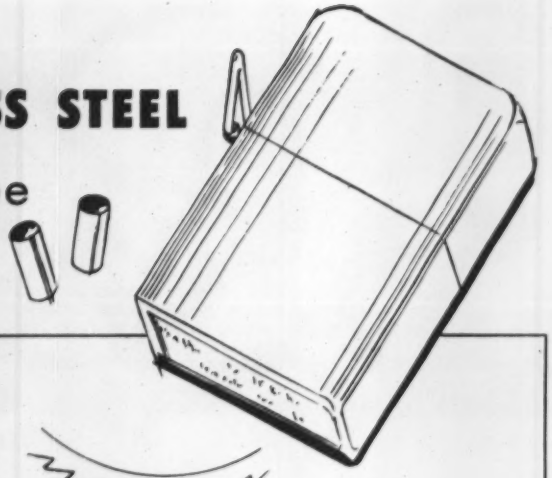
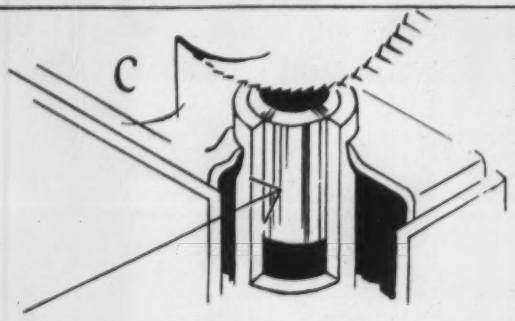
HOW ARMCO 17-7 PH STAINLESS STEEL keeps this lighter in shape

A tiny hardened Armco 17-7 PH Stainless Steel bushing is the key to dependability and long service life of a well-known lighter.





WHAT THE STAINLESS BUSHING DOES

This collar in the top of the tube keeps the flint in alignment and prevents jamming. The collar must be perfectly formed and very hard. That's why it's made of Armco 17-7 PH Stainless Steel, precipitation hardened.

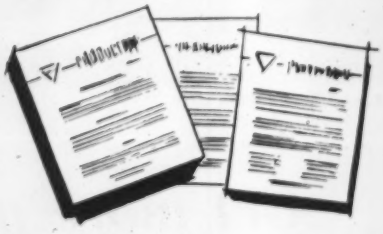
PREVENTS THIS

NO "FLOPOVER" FLINTS

In an ordinary flint tube, repeated pressure of the spark wheel against the flint causes the end of the tube to expand. This permits the flint to "flop over," making the lighter useless.

WHAT THIS STEEL OFFERS YOU

Consider the advantages of Armco 17-7 PH Stainless Steel for your products. It can be drawn and formed in the annealed condition to close tolerances. Then, it can be hardened at low temperatures to tensile strengths of around 200,000 psi. It is "transformed" by holding at 1400 F for 1½ hours and cooling to 60 F or below. Hardening is completed by heating to 950-1050 F, holding for ½ to 1½ hours and cooling.



GET COMPLETE DATA

Armco 17-7 PH is produced in sheets, strip, plates, bars and wire. Besides, there is a single heat treatment precipitation-hardening stainless steel, Armco 17-4 PH, made in bars, wire and billets only. For complete information on these special Armco Stainless Steels, just fill out the coupon and mail it to us.

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Guidance Abroad

Western orbit nations are in a new era of prosperity, and many Americans are beating a path across the Atlantic to see how they can participate.

It's a matter of determining whether to deal directly, appoint distributors, set up licensing arrangements or build branch plants.

Anyone traveling in countries west of the Iron Curtain inevitably will find it desirable to call on the American embassies and consulates for information and service.

No matter what information or assistance is needed, it's usually available from a file, a report or the brain of an expert.

There's information on population growth, national income, wage rates, export regulations and changes in duties. There are lists of metalworking plants, details on new trade arrangements, market analyses and reports on the outlook for foreign investments.

The visitor will be impressed by the helping hand extended so quickly and so graciously.

He will be equally impressed by the high caliber of the staff, by the excellent physical facilities and by the wealth of information available.

Not too many years ago, the Foreign Service held little attraction for Americans other than the fascinating prospect of living in another country. Pay was poor, and those going out on new assignments even had to take care of their own transportation.

The situation is much improved. The pay is better. There are living allowances. Commissaries provide American food at reasonable prices—there is one in the basement of Madam Luce's fancy palace in Rome! Travel allowances have been liberalized.

There are many spanking new embassy and consulate buildings, strategically located close to foreign government ministries and in industrial areas. They're laid out with roomy, comfortable offices, air conditioning and automatic elevators. They're surrounded by trees and grass. They reflect America's prestige and influence.

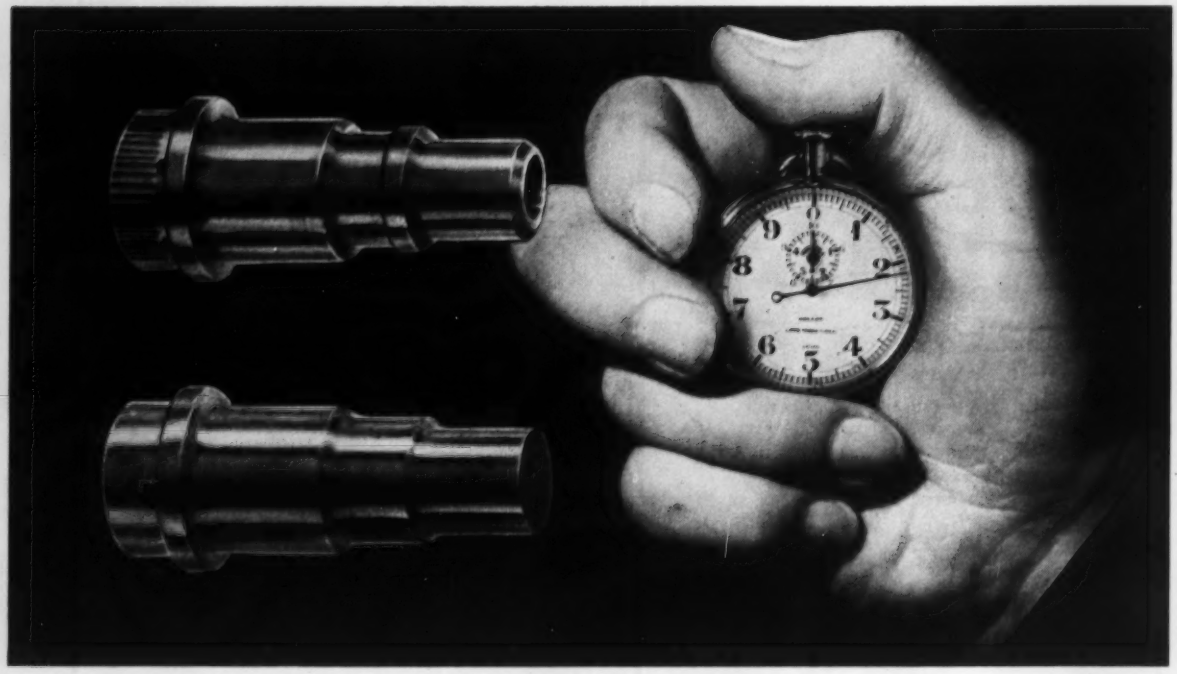
If you want current information without going abroad, you can get it through any one of 33 Department of Commerce offices.

If you want to establish personal trade contacts when you go abroad, U. S. agencies will announce your arrival.

Your foreign service officers are there to help you.

Irwin H. Such

EDITOR



Finished 50% faster

Using Ledloy from Ryerson

By the time the B-1113 piece was finished, you'd be halfway through a second Ledloy piece. Such greater speeds and feeds are possible with Ledloy because Ledloy contains a *built-in lubricant* which substantially reduces the friction between the steel and the cutting tool.

That built-in lubricant is *lead*—so finely dispersed through this free-machining, open-hearth steel that you can't see it with a microscope. The addition of this small percentage (.15-.35) of lead has no effect on the mechanical properties of the steel EXCEPT to greatly increase machinability.

Ryerson Ledloy machines up to 50% faster than B-1113 . . . tool life is extended as much as 200% . . . and net savings of 25% and more are effected. And Ledloy machines to an unusually clean, smooth finish—case hardens effectively —and bends, crimps, swedges or rivets easily.

Ask your Ryerson representative for the facts about Ledloy or write us direct for engineering data. Ryerson was the first to stock Ledloy and today your nearby Ryerson plant carries the world's largest stocks of Ledloy rounds, squares and hexagons in a wide range of sizes for immediate shipment when you call.

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How To Negotiate on SUP

1. As in any negotiation, enter the bargaining room with a realistic appraisal of what your firm can afford to offer. Whether the money is paid in SUP or in wages becomes important when you . . .

2. Determine your competitive position as to prices, costs and profits. If you are already in a marginal position, all that SUP is likely to do is make your competitive position worse and lead to a vicious circle of more SUP claims, less work and less profit . . .

3. Fight SUP, too, if you are a supplier and dependent on a market over which you have no direct control. While companies that can afford SUP and have few layoffs probably will not be hit, be prepared to lay out your case if SUP could bring hardship . . .

4. Suggest instead: A flat committment for severance pay. To sell the union on how tough SUP would be, consider your company's roughest period, which should be done anyway to gain a realistic appraisal of what the plan could cost you . . .

5. Don't fight SUP if your firm has stable employment, a good product and sales position. Use SUP as another reason for employees to stay with your company like pensions and insurance.

When You Write a SUP Contract

1. Insist on a proviso in the contract limiting company liability or canceling it in event of undue stress, such as a large-scale depression. A less desirable alternative: Make the contract subject to renegotiation under such circumstances.

2. Cover the big "ifs" in the Ford and GM contracts:

   A. Contributions to the fund must be ruled current operating expense by the Bureau of Internal Revenue.

   B. Such payments must not be construed as part of regular pay under the Fair Labor Standards Act by Department of Labor.

   C. State legislative approval of the supplementary unemployment payment principle must be achieved. Failure to get any one of these three provisions to your company's satisfaction should be a basis for canceling the plan.

3. Smaller companies in particular should attempt to get more flexibility written into contract clauses regarding transfers and job reassignments. Not too well written into the automaker contracts, this point is essential for smaller firms.

4. Resist a pattern settlement. Smaller companies that can afford less are getting more consideration today.

Industry Can Beat Heat on Jobless Pay

HERE'S ADVICE from industrial relations experts: Prepare now for SUP demands whether you expect them or not. It's like buying fire insurance; you may never need protection, but if you do, you need it badly.

The Supplemental Unemployment Plan is not proving to be the rallying point of labor negotiations for 1955 as many management men had feared. But the issue may be livelier in 1956 or later, when economic conditions aren't so good. Layoffs are infrequent today. Many workers feel that money is more useful than Mr. Reuther's ball of strings.

Counsel—If or when you get into SUP negotiations, make haste slowly (see checklist above). Remember that SUP is not a Guaranteed Annual Wage and that important safeguards are written into the contracts signed by the automakers. Costs can be calculated on SUP like any other labor cost. Be sure that your computation is accurate and that liability is limited by the contract to your estimated cost figure. With sound costing and a contract having the proper safeguards, management has little to fear from SUP.

In fact, SUP can be to management's advantage. Figure it this way: A company offers a predetermined amount to its workers. The cost will be the same whether 5 cents is paid to the worker outright or put into a fund. Because employment is stable, the com-

How Four Typical Contracts Have Been Settled:

UNION	NO. OF WORKERS AFFECTED	WAGE ADJUSTMENTS	FRINGE BENEFITS & DETAILS
UAW CIO	6000 (76 plants)	Skilled: 15c 6/55; 7c 6/1/56; 8c 6/1/57 Nonskilled: 8c 6/55; 6c 6/1/56; 6c 6/1/57 Apprentices: 11c 6/55; 6c 6/1/56; 6c 6/1/57	Supplementary unemployment compensation plan costing 5c an hour per worker with details to be worked out later; shift premiums increased to 15 and 20c; four paid holidays during first year of three-year contract, five during second year and six during third year; cost-of-living allowance change; liberalized pension benefits being studied; change in language on transfers, seniority, layoffs, etc.
UAW CIO	375	No wage adjustment	One-year contract; new pension plan costing about 8c per hour; minor changes in contract language.
UAW CIO	200	6c 5/23/55	Two-year contract with wage reopener 4/1/56; vacation benefits improved; pension plan increased, including a guarantee of five-year benefits to the employee or his beneficiary; double time for hours worked in excess of 11 in any one day; insurance benefits improved; change in language, including selection of arbitrator and eligibility for holiday pay.
UAW CIO	900	4c 7/11/55 6c or 2.5% 6/56 & 6/57 Skilled trades to be negotiated in supplemental agreement.	Supplementary unemployment compensation plan costing 5c per hour; pension benefits increased to $2.25 per credit year; vacations improved by allowing 2.5 weeks at ten years; seven paid holidays; triple time for worked holidays; cost-of-living allowance changed. Note: 4c raise was approved because company increased insurance benefits. Company pays premium.

Source: Employers Association of Detroit

pany knows the fund will build up to a certain point, and then contributions will cease. From that point on, the company is money ahead.

Company Gains — Every employee has an equity built up in the fund. It is a strong persuader against switching jobs for 5 minutes more wash-up time or other fringes. Under those conditions, a company has everything to gain from SUP for its workers and little to lose. If your firm fits that category, you might be wise to attempt to sell your workers SUP, contrary to the usual management abhorrence of the plan.

Most SUP demands on small companies today are a lever to strong-arm more cents per hour. You can offset that pressure by being prepared in advance. If you are willing to accept a carefully considered SUP, you may give union representatives the surprise of their lives. You may get the surprise of your life when the union readily agrees to drop the demand if you present strong arguments and figures to show why you can't afford it. Many labor people recognize the contradiction in SUP. Companies which haven't had layoffs frequently can afford the plan. Companies which have a layoff problem can make an understandable case that extra costs of SUP will snowball costs and aggravate the situation SUP was supposed to correct.

Talking Point—Much of labor is not serious about SUP today, although it may if times get tougher. Union leaders have noted the wildcat strikes that greeted the SUP settlement at Ford and General Motors and compared that response to the enthusiasm for the straight 15-cent cash gains by the steelworkers. Labor bosses are watching the efforts of some 2000 skilled craftsmen to leave the United Auto Workers and form their own organization. There's no splinter movement among the United Steelworkers.

Some companies, of course, have been or will be tapped for SUP

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *Penton Bldg., Cleveland 13, O.*

this year. Thompson Products Co., Eaton Mfg. Co. and Kelsey-Hayes Wheel Co. signed contracts with the CIO which followed in general the Ford-GM pattern. The pattern also seems likely to be accepted by other automakers, large auto industry suppliers and some farm equipment firms. Both the CIO and independent electrical workers have demanded the plan at General Electric Co.

No Pattern—But 1955 is not a period of pattern settlements. In smaller and medium-sized companies especially, settlements gravitate toward establishing pensions and insurance for companies that don't have them, increasing coverage for companies that do. In the picture are wage hikes, with particular emphasis being placed on the needs of skilled and higher seniority employees. Vacation extensions and more holidays are being requested, as are higher premiums for Sunday and holiday work. (See accompanying typical contracts recently negotiated.)

The specter of GAW is disappearing. The problem of SUP is solvable if you prepare now for demands that are likely to come when times get tougher. By then, legal contingencies of the Ford-GM settlements probably will be largely unsnarled by rulings from the Bureau of Internal Revenue, the Department of Labor and state governments.

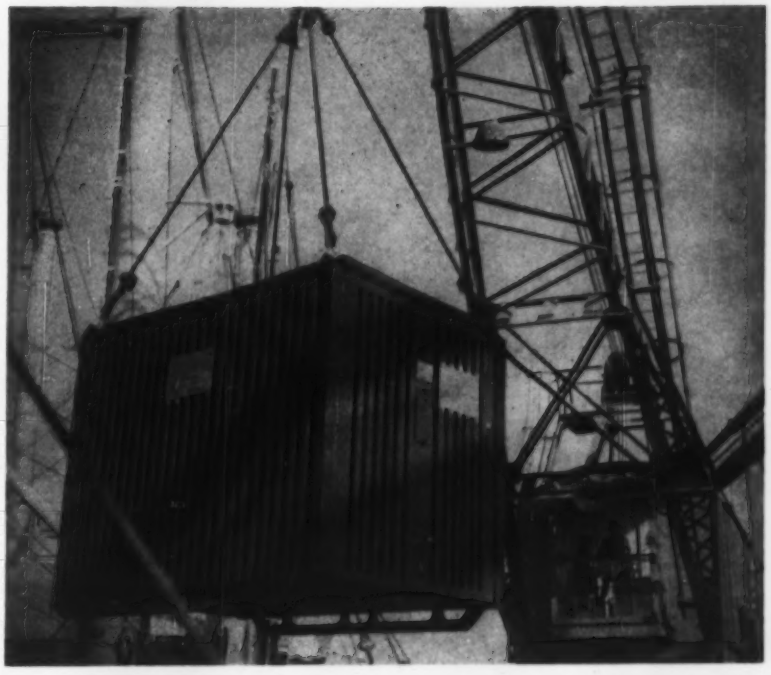
The Industrial Age

The average age of employed men ranges from about 32 in the air transportation industry to about 51 in real estate, reports the Census Bureau, Department of Commerce.

CCC To Buy Storage Bins

The Commodity Credit Corp. will buy storage bins with a capacity of up to 47 million bushels. The CCC is requesting bids on standard circular steel bins of about 3250-bushel capacity. They can be moved while erected, or can be taken down easily for removal to new sites.

The bins are needed for storage of part of the grain the CCC will take over later this year under 1954 price-support operation in 11 midwestern states.



These large steel containers help Army . . .

Cut Cargo Handling Costs

FIRST used experimentally during the Korean War, steel cargo containers are now recognized as standard equipment by the Army Transportation Corps.

The first order involves 10,000 containers, regarded as only the beginning by authorities. About 42 per cent of all supplies used by the Army can be shipped in them. Both Air Force and Navy are showing increasing interest.

Benefits—The containers reduce time and expense of loading and handling shipments during transit. They prevent loss by accidents, carelessness and pilferage. When used for equipment like radar, they insure that all components arrive at the destination together.

The containers are rectangular boxes (6 ft 3 in. x 6 ft 10½-in. x 8 ft 6 in.). Entry is by a double door across one end. They are made of 9-to-14-gage steel sheet cut to dimensions, formed and welded. Each weighs 1500 lb, is mounted on a base that is a pair of skids to permit handling by fork lift trucks and has lift rings at the top corners for crane hooks. Space in each container is 295 cubic feet, and each will accommodate a load weighing 8000 to 9000 lb.

Makers—They are being produced for the Army Transportation Corps by Jeta Mfg. Co., Yonkers, N. Y., and by Dravo Corp., Pittsburgh, which developed the prototype.

Army To Deepen Lake Channels

An Army report recommending the deepening of the channels between Lake Erie and Lake Huron (see STEEL, June 27, p.44) from 25 to 27 ft also recommends that a cutoff channel be constructed in Canada at Southwest Bend, St. Clair river. While more study would be needed before attempting the project, it is estimated that the initial cost would be $5.5 million. Maintenance is set at $10,000 annually. The report does not include the recommendation requested by local interests for the alignment of the channel in the Detroit river at Peach island. The House and Senate Committees on Public Works will study the full report.

Private enterprise gets results in uranium hunt

NEA

Uranium Search Clicks

THE UNITED STATES is "one of the world's leading uranium producers," states the Atomic Energy Commission in its semiannual report to Congress.

U. S. production of uranium ores and concentrates in the first half of the year set a record. Further gains in the next 18 months are assured by construction programs planned or started.

In Production — The U. S. is making hydrogen bombs like those detonated at the AEC Pacific proving ground in the spring of 1954. And chances of building a practical nuclear reactor for aircraft improve.

Production of uranium 235, plutonium and thorium hit new peaks because of the completion of new facilities at Hanford, Wash., and Savannah River, Ga.

Exploration — Stepped-up exploration by private industry has uncovered potentially large deposits of uranium ore in areas off the Colorado plateau in Washington, Texas and Colorado.

The government drilled 350,000 ft of test holes in the first half of 1955, below the rate for the last two years. But the AEC points out it's estimated that there is six times more private than government drilling going on.

In operation are 850 uranium mines in the U. S. A year ago there were 795. Output of ore is still running ahead of processing capacity in some areas, but mills are being planned to whittle down stockpiles.

More Geiger Counters—Applications for assistance in uranium exploration are at a record level. The Defense Minerals Exploration Administration had 59 requests in both the first and second quarters of this year. Requests are running about 50 per cent ahead of those in the last quarter of 1954.

Test Bolivian Iron Deposit

Diamond-drilling exploration of what is believed to be one of the largest deposits of iron ore in the free world was started by H. A. Brassert & Co. The deposit is at Mutun in the eastern tip of Bolivia near the Paraguay river.

J. E. Brassert, company president, says the deposit consists of a large upthrust triangular block several miles on a side, rising 3000 feet above the level plain of the river basin. Average quality is 50 to 55 per cent metallic iron. The deposit includes millions of tons of partly leached and enriched ore from which a substantial tonnage of concentrate exceeding 60 per cent iron could be produced.

The Paraguay river is navigable for ore barges about 10 months of the year. The Mutun ores could be barged close to 1500 miles down the river to Buenos Aires, Argentina; Montevideo, Uruguay; and other cities in the Rio de la Plata basin. The present drilling program is to appraise further the economic aspects of the ore body.

U. S. Steel Flaps Wings

Executive air travel is gaining altitude—U. S. Steel Corp. is expanding its executive plane fleet.

Two new Learstars, a souped-up version of the Lockheed Lodestar, have been ordered. The $300,000 planes will be stationed at branch offices, one at San Francisco.

U. S. Steel recently ordered three British-built turboprop Viscount planes to replace planes withdrawn from service.

U. S. To Take Inventory

The acquisition cost of the real estate and personal property of the government will be reported in January next year. The House Committee on Government Operations is preparing the survey. It will include the property in the continental U. S., the territories and abroad as of June 30, 1955.

The survey is expected to aid the government's management supply program and the disposal of surplus property.

Freight Rates: Up?

ICC examiner suggests hikes up to 5 cents for 50 miles on volume steel products

SHORT and medium-haul rail and truck freight rates on some steel products in the East are too low.

That's the burden of a report made by Michael T. Corcoran, an examiner for the Interstate Commerce Commission, after an investigation that started last fall. The report recommends "substantial" rate increases for such volume freight as sheet, strip and coil.

Where—Big consumers of these products are auto, appliance and container manufacturing companies. If approved by the ICC, the increase would apply to shipments of manufactured iron and steel products between points east of the Mississippi and north of the Potomac and Ohio rivers.

For hauls up to 50 miles, present rates for iron and steel articles carried by highway or rail are about 13 cents for each 100 lb, with a minimum load limit set at 40,000 lb for trains and 28,000 lb for trucks. For 100 miles, the rates are about 22 cents; for 250 miles, 36 cents; and for 500 miles, 60 cents.

How Much—Using the proposed schedule, the minimum rate is 18 cents for 50 miles, 32 cents for 100 miles, 44 cents for 250 miles and 67 cents for 500 miles. For hauls of above 750 miles, the report suggests that rates should be lower than those in use.

Rates subject to a minimum rail shipment classification of 80,000 lb would be lower than these figures on a sliding scale by as much as 5 cents for distances over 140 miles. Under present rates, 80,000-lb shipments are transported at charges which are generally under those for the 40,000-lb minimum schedule.

Why—As a result of intense competition between rail and truck freight carriers for steel traffic, says Mr. Corcoran, rates are unreasonably low and in contravention of the national transportation policy.

Flanging plus a detachable coupler eliminates welding

Aluminum Speeds Oil Line

OIL FIELD "roughnecks," long used to handling steel pipe, are finding aluminum pipe a soft touch.

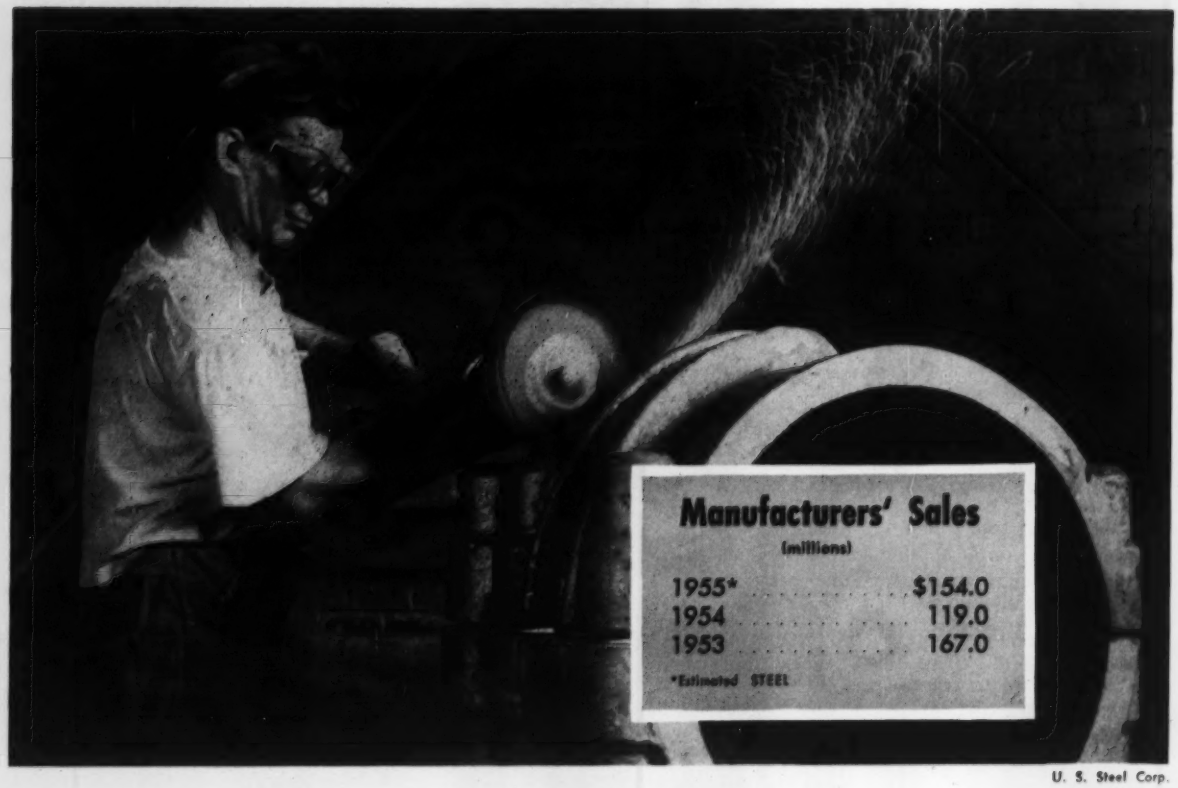
The new pipe, made by Kaiser Aluminum & Chemical Corp., Oakland, Calif., is roll formed and welded from high-strength aluminum sheet in 2, 3 and 4 in. diameters. It can be flanged readily, either by power machinery in the shop or warehouse or by hand tools in the field.

Advantages—The welded aluminum pipe system, Kaiser claims, provides low initial cost, speed and ease in installation, light weight, inherent corrosion resistance, simplicity of pipe lining and field adjustment, high strength, flexibility at joints and a smooth inside surface that minimizes friction and turbulence.

Installations of the new petroleum pipe have been made for fuel and water supply lines on drilling rigs in the Southwest and Midwest. Expected uses include secondary recovery by salt water injection, salt water disposal, low-pressure flow lines and gathering systems.

Weight and Costs — A 30-ft length of 4-in. aluminum pipe is an easy one-man load of 31½-lb. One mile of the new pipe can be installed for a little over $44. This includes loading, stringing, connecting and reloading of 4-in. drilling rig supply pipe. Less than 20½-man-hours are required. Time and costs, according to Kaiser, are about one-sixth of old methods. Cost of 4-in. pipe is about 60 cents a foot.

Design of the cast couplers permits the aluminum pipe to curve around obstacles and follow rises or dips in the ground. A 90-degree turn can be made in four 30-ft lengths of pipe without elbows or other special connections.



U. S. Steel Corp.

Abrasive Wheelmakers' Sales Near '53 Peak

PRODUCERS of bonded abrasive wheels are grinding out sales at a pace 25 to 30 per cent faster than they did last year. Outlook for this year: Sales will be 5 per cent below (see chart) the 1953 peak.

Progress in grinding is stimulating abrasive wheel sales. Close to 200,000 types are made. Also influencing wheel types and sales volume are the scores of grinding machines with new features and processes that have appeared on the market the past year. Most machines are designed for automatic and semiautomatic operation.

Market Expansion — Technological developments are at an all-time high. Example: In recent months, Norton Co., Worcester, Mass., has introduced: 1. Vitrified bond for grinding wheels—primarily for cylindrical, centerless, surface, toolroom and thread grinding. 2. Resinoid wheels for roughing. 3. A small, triangular abrasive for barrel-finishing metal parts. 4. New 60-in. lapping wheels. 5. A remotely controlled snagging machine. 6. Pure oxide coatings. 7. Silicon carbide heating elements for industrial furnaces. 8. Behr-Manning Corp., a Norton subsidiary, is producing a new-type, wearable, coated-abrasive wheel for automatic metal polishing.

Bright Spot—Bay State Abrasive Products Co., Westfield, Mass., feels that the bright spot of '55 is the ample supply of raw materials, including industrial diamonds which were difficult to get until two years ago. It's noteworthy, says Bay State, that distribution is about equally divided between industrial supply houses and direct shipments.

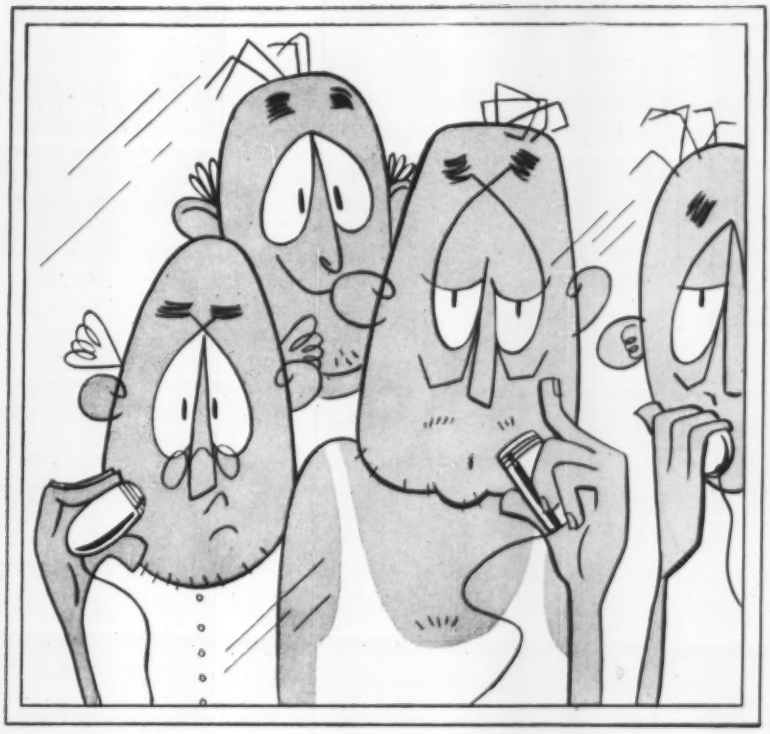
Like Others—Carborundum Co., Niagara Falls, N. Y., declares that costs have increased more than prices in the last five years, while only a portion of the rising costs for materials and labor have been passed along to the user. Among other problems, reports Carborundum, is the need for a new approach to sell the abrasive method for metal removal. Elimination of product liability action against grinding wheel manufacturers on wheel breakage cases is needed, says Simonds Abrasive Co., Philadelphia.

Despite those problems, concludes Simonds, the second half should be good, with more sales going to distributors. Industry status: Backlogs are from four to six weeks; delivery on special products is running from four to eight weeks.

Precast Roofs: Use Rises

Nearly 69 million sq ft of noncombustible, precast concrete roof decking was installed on new metalworking and machinery plants in the last ten years. Biggest user was the automotive industry —as of last December, almost 30 million sq ft.

A survey for the Precast Concrete Roof Deck Manufacturers shows a total of more than 203 million sq ft installed in the last decade at over 8000 locations.



Some 4.6 million electric shavers will be sold in '55 as . . .

Men Turn from Wet to Dry

ELECTRIC SHAVER sales are humming. In 1954, they topped the $100-million mark for the first time.

It is estimated by the country's four leading producers—Schick, Remington, Sunbeam and Ronson—that 4.5 million units were manufactured last year. Retail sales were $112 million.

Future — Industry leaders feel that from 4.6 to 4.8 million units can be sold this year. This would lift retail sales to the $115 million to $120 million bracket.

An electric shaver is a personal item with gift appeal. Its sales cycle is seasonal. Because of Christmas, October through December is a banner period. In June, graduation and Father's Day help bolster sales. The industry counts on doing one-third of its annual volume during the first half of the year and two-thirds in the second half.

Shavers?—The number of men who dry shave in this country is believed to be in the neighborhood of from 12 million to 15 million. This represents 25 to 30 per cent of the nation's 50 million shavers.

Manufacturers no longer find it necessary to allocate production as they did after World War II when metal problems hindered output. Production is abreast of sales and competition is exceedingly keen.

Nuts and Bolts—Counting individual screws, fasteners, washers, etc., the number of parts in an electric shaver ranges from 35 to 100. It is customary for the large producer to make most of his own parts, including plastic items. Others make about 25 per cent, purchasing the balance.

There is some competition from foreign-made electric shavers, but it is not enough to be disturbing because of fairly low domestic sales saturation, but there is a growing market abroad for American-made shavers. Among the areas being cultivated are England and nations in continental Europe, Australia, Mexico, Cuba, Uruguay and Venezuela. Some companies have manufacturing facilities abroad; others merely export from the U. S. to favorable market areas.

Improvements—Technical developments in electric shavers have centered on refinements during the last year or two. Key changes: Larger and more efficient heads and moving parts which incorporate greater reliability and performance.

More Chiefs than Indians

For the first time in many years, the steel industry had more stockholders than employees last year, says the American Iron & Steel Institute.

Companies reporting to the institute had nearly 770,000 stockholders at the end of the year. Their average monthly total of wage and salary employees was 762,830. These companies made about 95 per cent of the steel produced in the U. S.

The figure for stockholders includes those with holdings in more than one company.

All employees, including those in mining, transportation, warehousing, fabrication and other nonsteel producing activities, as well as those in production and marketing of iron and steel, are included in the employee total.

At the end of World War II, the industry had 540,000 stockholders, 600,000 in 1949, over 700,000 in 1951 and 779,000 in 1953.

Steel Safety Sets Record

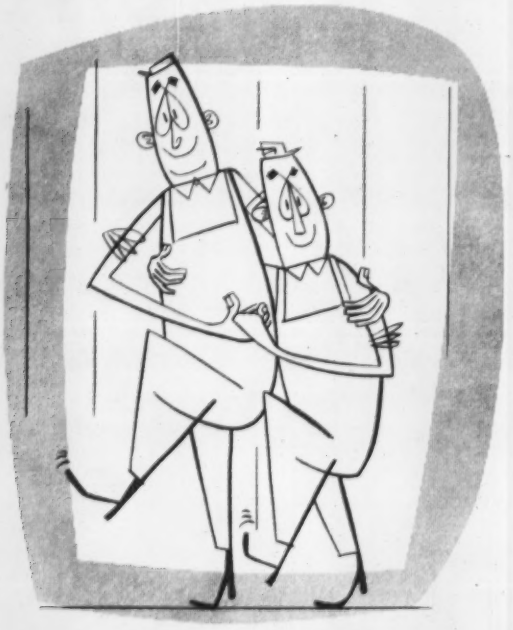
Steel is one of the nation's safest industries; the American Iron & Steel Institute reports the industry's disabling injury rate fell to a new low last year.

Record: 3.85 disabling injuries per million man-hours worked. National Safety Council statistics show the average for all industries was 7.22.

The steel industry has shown improvement for ten consecutive years. The rate for 1954 was 52 per cent lower than 1944's.

The all-industry rate has fallen 8 straight years. Last year was 49 per cent lower than 1946.

By E. C. KREUTZBERG *Washington Editor*



Labor To Take '56 Spotlight

LABOR legislation, sidelined in 1954 and 1955, will be back in the news next year. The merger between the AFL and CIO is slated to be consummated this December, and union plans already are being made for a vigorous campaign in the next congress.

George Meany, who will head the consolidated union, asserts that stronger political action is needed "to change the political picture that is developing against labor." He hopes that his some 16 million workers, with their families and friends, will be able to dictate the character of future labor legislation.

Questions—But many people feel that organized labor already enjoys too much power over legislators, that it tends to be irresponsible in ordering strikes that could paralyze the nation's economy and that its perennial demands for "more" are the biggest single factor in promoting inflation. Look for hard-nosed opposition to a big labor political program, not only from employers, but from such other independent groups as the farmers.

It's also far from certain that labor's endorsement of a candidate or of a legislative measure will increase in value with the merger. Much will depend on the community in question, or the segment of the population involved. In the past, union support has often been seen as a "kiss of death."

Record—In 1954, labor-supported candidates won Senate seats in Alabama, Illinois, Kentucky, Maine, Montana, New Mexico, North Carolina, Oregon, Rhode Island, Tennessee, Texas, West Virginia and Wyoming.

But the unions did little crowing. The labor-supported candidates lost in the races in California, Colorado, Idaho, Iowa, Kansas, Massachusetts, Nebraska, New Hampshire, New Jersey, Ohio, South Carolina and South Dakota.

Opposition Shapes Up — The courts are being criticized for their leniency in allowing unions to give more financial support to favored political candidates than would be permitted under a tight interpretation of the Corrupt Practices Act. This opposition will be formalized into a bill next year, and will be supported en masse by Republicans. A renewed effort will be made to pass the Goldwater bill, giving the states the right to regulate strikes, picketing and boycotting.

Things will be just as tough for the big union at the state level. Utah became the 18th state to enact a right-to-work law this year. Other states will vote on the issue in 1956. The union will wage a last-ditch fight for repeal of Wisconsin's Catlin law which sharply limits labor spending. Pennsylvania, West Virginia, Indiana and Texas have such statutes on their books, while Ohio and Michigan legislatures considered similar action this year.

Battle Cry—Many organizations already have broadcasted their feelings about labor in politics. The National Right to Work Committee, whose head is former Rep. Fred A. Hartley Jr., Taft-Hartley Law cosponsor, says: "Americans must have the right but must not be compelled to join labor unions." The National Economic Council says: "Unless the new group is restrained by law, like other monopolies it will be tireless in its reach for power". Henry G. Riter III, president of the National Association of Manufacturers, predicts that the one big union will multiply labor's efforts to bring about repeal of Taft-Hartley and the right-to-work laws in 18 states.

Piggyback Rate O.K.'d

"It's legal; the rates are reasonable." That is the Interstate Commerce Commision's ruling on rates charged by six eastern railroads to pick up goods in their own trucks, move the truck by flatcar to another point, then make deliveries with the truck.

The ICC says the present schedule of rates "is consistent with the national transportation policy to avoid unfair or destructive competitive practices."

The rates were under fire by four terminal railroads in the New York City area and some trucking companies. They argued that collection and delivery took place over a larger area than lawful.

The commission disagreed but said tariffs, which show the freight rates to and from various cities, are not clear and should be made more specific.

WASH THAT DIRTY STRIP
BEFORE SHEARING and BLANKING

McKAY
PRESS FEED
AND
CUT-UP LINES

The latest development in McKay coil feed lines is this new strip washing machine which thoroughly cleans the strip after it leaves the coil and before it passes through any subsequent feed rolls.

In most stamping plants a sizeable portion of metal finishing costs and quality control problems can be traced to the fact that some coiled steel is dirty and much of this dirt picks up on the rolls of the processing equipment. The dirt which carries over on the blanks may cause scratches in the drawn panels during the forming operations.

In several recent installations McKay has furnished a strip washing machine which utilizes high speed brushes and large volume solvent sprays to thoroughly clean the steel strip at high production speed.

CONSULT McKAY ENGINEERS IF YOU HAVE A PRESS OR SHEAR FEEDING PROBLEM. WE INVITE YOUR INQUIRIES.

The McKAY MACHINE Company
YOUNGSTOWN, OHIO

McK

ENGINEERS AND DESIGNERS OF EQUIPMENT FOR THE AUTOMOTIVE, FABRICATING AND STEEL INDUSTRIES

BASEMENT BARGAIN for Paint Finishing

NOW PD ENGINEERING—CONSERVES floor space... UTILIZES basement areas for disposition of paint laden air . . . RETURNS washed and filtered air.

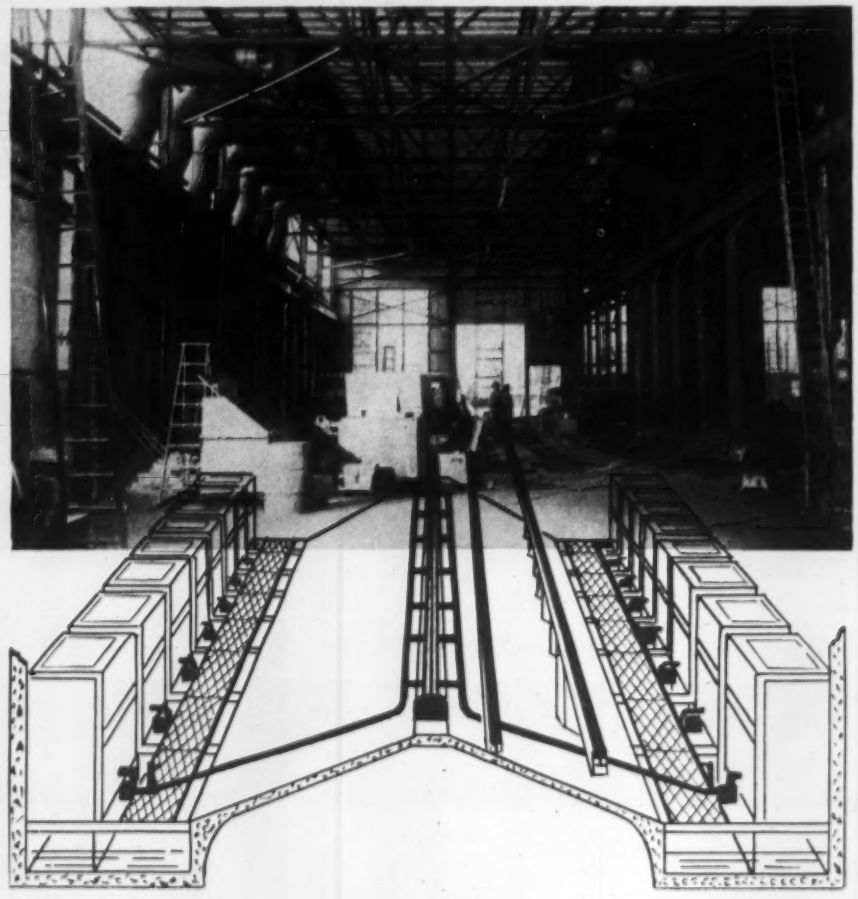


Photo (while under construction) and Drawing of P-D Finishing System above illustrate (1) the complete freedom of movement without loss of any floor space, and (2) the elimination of expenditure for air make-up because of cleansed air-return feature of this installation.

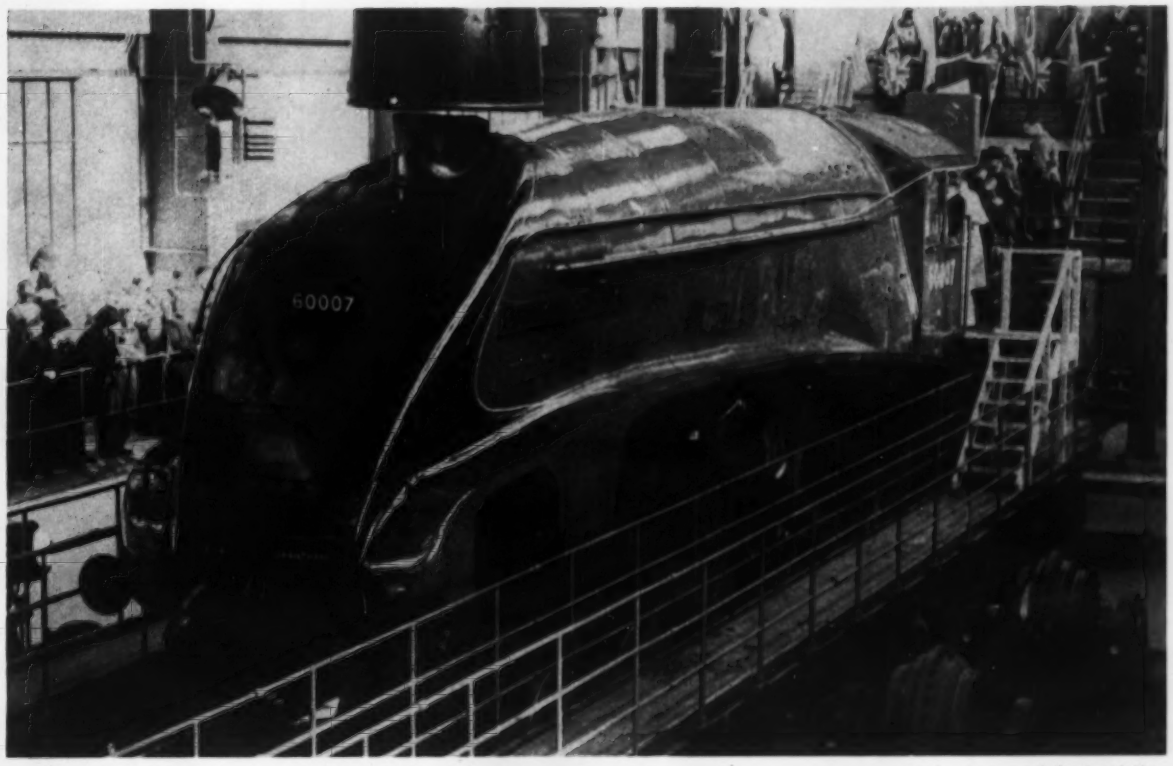
This new installation of a Peters-Dalton Hydro-Whirl Finishing System in the plant of a major manufacturer of milling machines has overcome many serious problems. In this case, dirty, inefficient, and dangerous conditions otherwise thought insoluble have been overcome. The machines made here are of huge size (castings weighing up to 90,000 lbs.) and handling operations must necessarily be held to a minimum. Complete finishing operations now can be carried on by any number of men—working on all sides of the machines—in unpolluted air. The Finishing System engineered and built by Peters-Dalton permits the placing of these machines in a room fitted with floor gratings. The paint laden air (over 150,000 CFM) is drawn down through these gratings to a lower level and thence through the P-D washer sections, where it is "knocked down" by the Hydro-Whirl scrubbing action which returns it washed and filtered to the finishing room. It is a finishing system that not only solves the problems of a particular manufacturer but is so excellent that it meets insurance company standards and code requirements of most states for the return of cleansed air to a room.

Finishing Systems by Peters-Dalton are designed for the job — to do the job. Whatever your needs . . . from cabinet size to installations comparable to the one illustrated here . . . depend upon P-D designing and engineering. If you want to modernize, economize, increase production and efficiency, we'll be glad to tell you more. Just write, wire or phone.

Representatives in Principal Cities

PD Peters-Dalton INC.

PD Hydro-Whirl Paint Spray Booths
PD Industrial Washing Equipment
PD Drying and Baking Ovens
PD Hydro-Whirl Dust Collecting Systems



Authenticated News

Steam units like this will gradually disappear in a $3.7-billion program as . . .

British Railroads Begin Big Modernization

VISIT any one of a thousand downgrades on British railroads and you will find freight trains grinding slowly to a halt.

The reason quickly becomes obvious. Most of the four-wheel tinker-toy goods wagons (freight cars) have no automatic airbrakes and have hook-and-chain couplers. The brakemen must pin down the hand brakes before the trains can creep downhill. Brakes must be released before the train can proceed.

That's one reason why Britain's 1900-vintage railroad system will spend $3.7 billion on modernization over the next 15 years. This is the breakdown:

Locomotives: $1 billion. Diesel and electric types will gradually replace steam locomotives. Diesels are favored because they require no overhead structures and can be placed in service as fast as they can be built. A diesel with hydraulic drive developed by MAN in Germany and licensed to North British Locomotive Co. is being considered. Eventually, 2500 mainline diesels will be in use, plus 1200 switchers.

Cars: $850 million. A few non-corridor compartment carriages will be saved for suburban services. The others will be replaced by 31,000 of the modern corridor type.

Also planned are 4600 multiple-unit diesel trains. For suburban service and lines with high traffic density, 3600 multiple-unit electric trains will be needed.

Freight Service: $1 billion. Scheduled for scrapping are about 400,000 miniature freight wagons. In their place will be 255,000 new cars. They will carry 24½-tons of coal, compared with 15 tons now.

Fifty-five large, modern freight-yards will be constructed or rebuilt with complete handling facilities. About 150 will be closed.

Tracks and Signals: $630 million. Centralized traffic control, automatic train controls and improved signaling systems to permit higher speeds are part of the plan. Mainline speeds of at least 100 mph are contemplated.

Other Facilities: $100 million. Included will be $36 million for improvement of port and areas. The balance will go for such things as mechanical office equipment, electronic computers and better facilities for workers.

England Builds Strip Mill

Over $10 million will be spent on a steel strip rolling mill by Steel, Peech & Tozer, a branch of United Steel Companies Ltd., Sheffield, England.

The mill will make strip from 4 to 18 in. wide. Thicknesses will range from 0.042 up to ¼-in.

Over $131 million has been spent in United Steel's postwar expansion program.

Check Your "Do-It-Yourself" Potential

1. Is product modification feasible?
2. Does the product fit the market—as a hobby or practical money-saving application for the home, yard, garden or automobile?
3. Can present distribution channels be used to reach the market?
4. Is the price competitive? Do cost savings possible through "doing-it-yourself" offer strong sales appeal?
5. Can you provide adequate service and supply facilities?
6. Will a product in the "do-it-yourself" market create friction in your present sales setup?

The Home Handyman: Make Him Your

"DO IT YOURSELF and save."

That's the appeal pulling John Q. Public into one of the nation's newest market developments. It's worth your investigation for sales possibilities. John Q. is spending an estimated $7 billion annually to do it himself.

Snowball—Not all that goes to metalworking, but the power tool industry provides an excellent example of what can be done if your product fits. Before do-it-yourself, power tools in the home were as scarce as extra light bulbs. Annual sales for home use now are estimated at $100 million plus.

Boosting the trend: More leisure for hobbies and puttering around, increasing home ownership and the cost of hiring outside labor for odd jobs.

Switching—Take a look at the checklist to see if your product has possibilities—answers to the first five should be "yes."

Power tool makers that once sold chiefly to industry found it pretty simple to make the switch from heavy to "home duty" tools. Not all products can be modified that easily. Your solution may be in selling your product in kit form, like the plywood boat kits. Maybe Reynolds Metals Co.'s aluminum for home use will be suggestive—Reynolds makes soft-alloy aluminum in several shapes and in sheets that are worked like wood.

Market—Stewart-Warner Corp., Chicago, found that by making slight modifications to its auto instruments it had a market for a "hot rodder's" instrument panel which sells at a premium price.

Nobody worries about the line between hobby and do-it-yourself; one complements the other, say officials at Skil Corp., Chicago. Skil started its drive for do-it-yourself about 1949 and now has about 40 per cent of its volume going there. Most feel that the cost-saving possibilities around the home offer the best sales appeal.

Distribution—Don't get caught short with a good product and no method of getting it to the customer. New distribution systems cost money, so you've got a head start if you can use present channels. Mall Tool Co., another Chicago power tool maker, goes direct to the retail store through the warehouse setup it has for industrial products It has factory-trained specialists at warehouses to service tools.

Mall officials recommend checking the attachment possibilities for your do-it-yourself product. Mall

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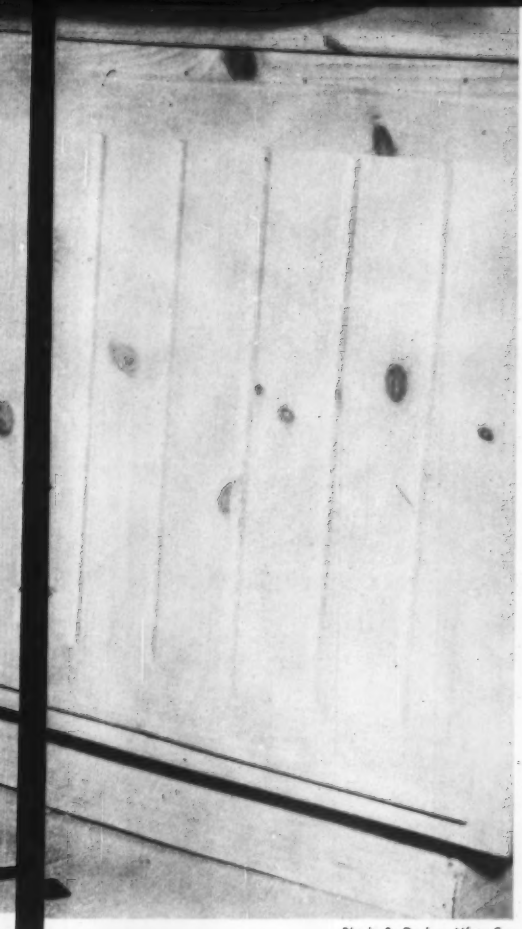
** Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.*



Black & Decker Mfg. Co.

New Customer

makes a basic drill set. It does a big volume in attachments like grinders, polishers, saws, drill stands, sanders. A planer attachment will be introduced this fall.

Precaution—Before entering the market, don't overlook the effect it might have on your present sales setup. Take bathroom fixtures, for example. One manufacturer says his products are a natural for the market, but he can't push them because most bathtubs are bought by plumbing contractors who install them. "You couldn't expect contractors to keep pushing our line if we were pushing the idea of installing tubs yourself to save labor costs."

Hardware stores still rate high as the best way to reach the customers, but variety stores, jewelry and even drug and supermarkets are displaying more do-it-yourself items. For advertising, the industry is hitting the leading hobby and craft magazines, plus the top national family magazines like *Life* and *Saturday Evening Post*.

Ballyhoo — The do-it-yourself shows sponsored by William S. Orkin, New York, get under way in September and run till spring. Cities on the schedule include Buffalo, Atlanta, Milwaukee, Chicago, Philadelphia, Boston and New York. Expected attendance: 3 million.

Some officials feel the spectacular sales spiral in do-it-yourself has begun to level off. From here on out it'll be a steady rise based on both market expansion and introduction of new products.

ODM Issues Tax Write-Offs

Certificates of necessity for accelerated tax amortization for 40 new or expanded facilities were issued by the Office of Defense Mobilization from June 30 through July 13. Value of facilities: $47,768,434.

The three largest certificates went to: Consumers Power Co., Muskegon, Mich., electric power generating facilities, $18,280,000, with 35 per cent allowed for accelerated tax amortization; Aerojet - General Corp., Sacramento county, Calif., research and development facilities, $6,525,800, with 70 per cent allowed; and Atchison, Topeka & Santa Fe, Topeka, Kans., centralized railroad traffic control system, $4,020,534, with 40 per cent allowed.

Small Motors Go NEMA

General Electric Co., Schenectady, N. Y., says 80 per cent of its 1 to 5-hp induction motors are being built to dimensions recommended by the National Electrical Manufacturers Association. A company executive predicts this percentage will rise.

Thorn L. Mayes, general manager of the company's Small Integral Motor Department, Ft. Wayne, Ind., said the switch has moved rapidly since the new motor's introduction Jan. 1, 1954.

Acceptance has been speeded by a demand for more power in the same space. The new motors are 30 per cent lighter.

Where They Stand

American Management Association conducts its first study on foreman's compensation

THE TYPICAL American production foreman earns $6241 a year, says an American Management Association survey.

Conducted from December, 1954, through February, 1955, it reports on 6500 foremen in more than 100 companies.

Other results: The foreman of a major production department averages $7416 annually; general foreman, $8479; the maintenance foreman, $6822. All figures apply to first-line supervisors in durable-goods industries.

History—A profile of the average foreman shows that he is 45 and has been on his job eight and a half years. He supervises 42 hourly workers.

Last year, 66 per cent of these line supervisors received pay boosts which averaged 6.3 per cent. Some 40 per cent of the durable goods industry foremen are included in a company bonus plan.

Consideration — Few geographical differences in compensation were found. A foreman's salary is primarily dependent on the number of employees supervised.

The salary range for each position, regardless of industry, company size or location, is fairly narrow, the study shows. Some 95 per cent of all salaries reported fell between $4600 and $10,000 a year.

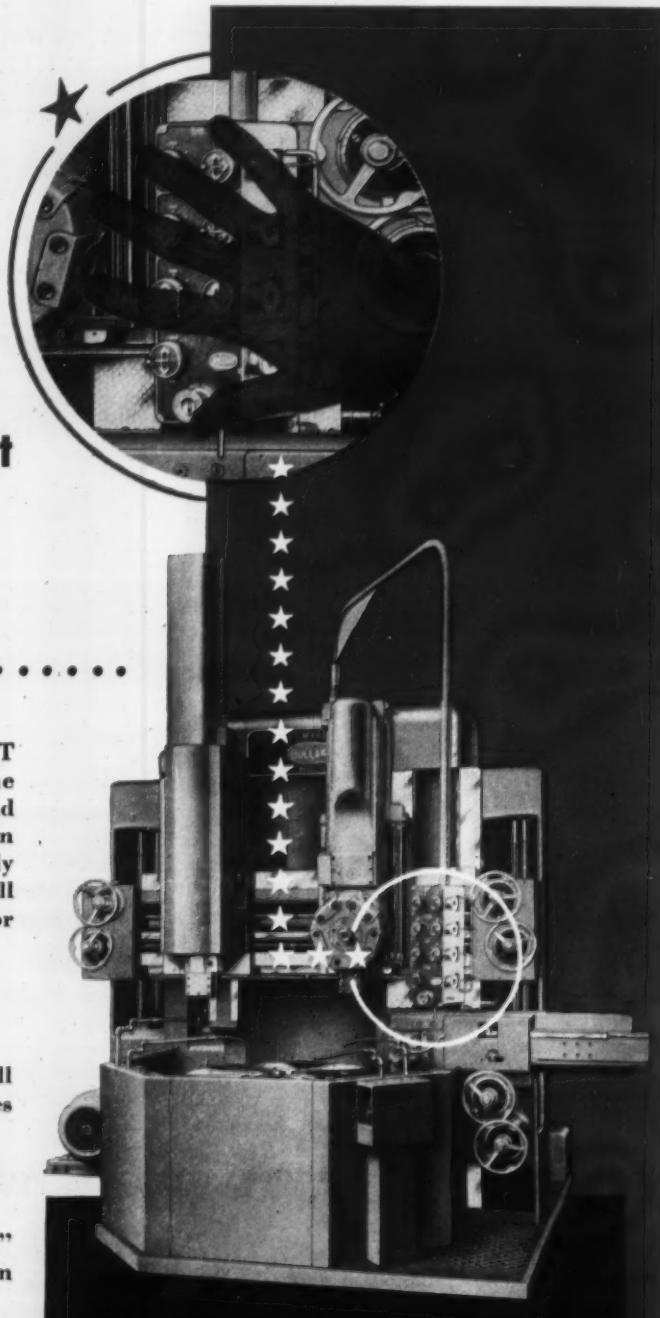
AMA: Personnel Report

The number of people in personnel and labor relations work has hit a new high, reports the American Management Association. For each 100 employees last year, 0.70 were in personnel and labor relations. This year the figure is 0.80. Personnel directors are getting an average of $10,530 a year, a six per cent boost over the $9932 they got last year.

The average director is 43 years old, with 12.3 years in the field and 6.4 years in his present job.

Within the Span of a Man's Hand

The power to transmit the commands of the operator *to the machine* . . . . . .



By means of the movable PENDANT CONTROL the start and stop of the spindle; selection of speeds, feeds and directional movements of all heads in feed or traverse are quickly and easily accomplished. Interlocks and a stopall stick provide safety for both operator and machine.

Additional features include:

SCREW FEED

for vertical and horizontal motion of all heads — to assure fine smooth finishes with greater accuracy.

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Five sided turret for "run of the mill" jobs. Four sided turret for production jobs.

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BULLARD
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CUTMASTER
VERTICAL TURRET LATHE
Model 75

THE BULLARD COMPANY
BRIDGEPORT 2, CONN.

AVAILABLE IN 26, 36, 46, 56, 66 AND 76 INCH SIZES

Why 12-Volt Ignition?

The chief answer: To get enough power to fire today's high-compression engines. The next step may be a 24-volt system because power loads will be going higher

WITH THE INTRODUCTION of 1956 models, almost 100 per cent of the auto industry's passenger cars will have 12 instead of 6-volt ignition.

Initiator of this re-volting development in the auto industry was GM's Delco-Remy Division at Anderson, Ind. Director of sales and engineering, J. H. Bolles, points out that when the system was introduced on Cadillac and Oldsmobile in 1953, many felt the move was arbitrary.

History—Changes in voltage certainly are nothing new to automakers. In the earlier periods of the industry, systems of 6, 12 and 24 volts were used on various cars. Dodge had 12-volt systems about 1920 because of its combination starter-generator. Driven from the crankshaft by chain (gear ratio, 3:1), the unit needed that much power to crank the engine fast enough to start it.

Earlier electric starters of C. F. Kettering required 12 or 24 volts. Engine speeds of about 2200 to 2400 rpm of the 1912-to-1920 period permitted use of combination starter-generator units which are no longer practical with today's high speed engines. With the separation of generator and starter, the industry pretty well standardized on the 6-volt systems.

Preferred Abroad — Twelve-volt systems have been used on other cars, particularly those built in England. There's a mighty good reason. Most of their engines are high-winding jobs which turn up around 5500 rpm or so to get the maximum output from their generally small and economical displacements. That requires plenty of valve overlap; valve overlap, in turn, requires relatively high cranking speeds. Then, too, as rpm goes up, cylinder combustion pressures increase—but that's getting ahead of our story.

Busses (for a different reason) were among the first to go to 12 volts in this country. Light wiring in a bus must be lengthy. Long wires, in turn, entail a current drop. To light the busses properly, 12-volt ignition and electrical systems were incorporated.

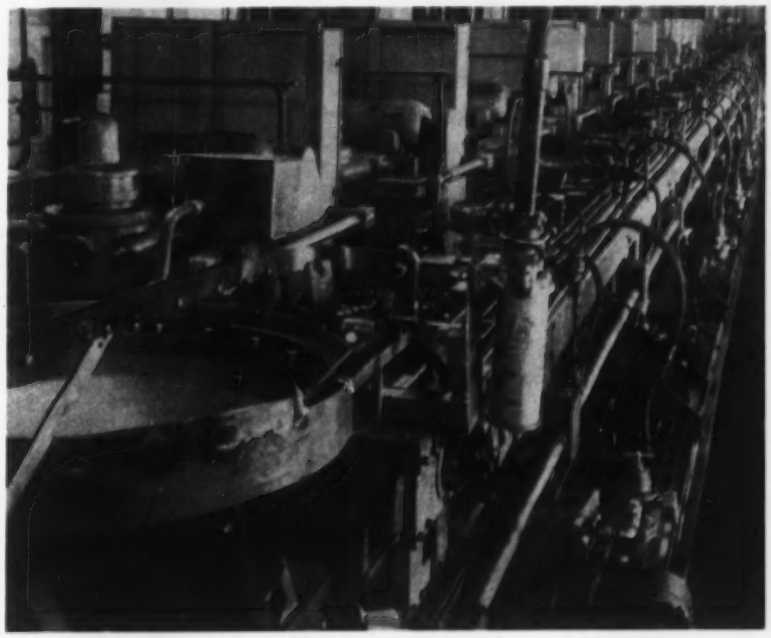
Diesel Demand — Trucks, too, went to 12 volts on diesel jobs for still another reason. A gasoline engine will start at a cranking speed of about 25 to 35 rpm. A diesel won't kick off until the tach is close to the century mark. Because of high compression, it takes plenty of oomph at the starter motor.

Why 12 volts in American passenger cars?

Explanation—Although there are plenty of advantages, the basic reason for the switch is increasing compression ratios. As mentioned above, when cylinder pressures go up, that requires more voltage to get the spark to jump the gap at the spark plug. Higher compression ratios contribute to such a condition, as do more revs being turned out by modern engines.

Other solutions are possible. Racing cars use a magneto, as did such vintage items as the Model-T Ford. While magnetos offer increasing voltage with increasing rpm, cost is against them.

Another possibility: Double breaker points and two coils—as on the Graham-Paige some years ago and still used by many hot rodders. This system not only has



Electronic Ears Test Gears

These 15 gear-shaping machines handle one of the 14 operations on Buick's new automatic process lines that produce pinion gears for Dynaflow transmissions at the rate of 3 million a year. Forty machines in the line are connected by more than 650 ft of conveyors and five distributors. New developments include electronic ears that test gears for noise and gages that measure and segregate gears and adjust machines to correct errors

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cost against it. It offers a second obstacle in synchronization. The higher-rpm engines of today demand closer spark settings than ever before. Synchronizing two sets of points, as well as timing both, would create service problems.

Advantages — That leaves 12-volt ignition, which does the engine firing job nicely and other things, too. Engine cranking speeds are higher. That means easier starting of the hot-rodded engines in today's cars. Due to the better breathing of today's engines, coupled with the higher compression ratios, low-speed cylinder pressures averaged 40 per cent higher in 1953 than in 1946. High speed pressures were up 65 per cent.

Demand for generator output has risen steadily in cars as accessories continue to be added. From a demand of 100 watts in 1925, the average jumped to about 400 watts in 1953 and probably is well over that figure today. At least 30 per cent more output can be obtained from the same size generator if the system is changed from 6 to 12 volts. The maximum output also is reached at lower car speed, making it possible to maintain better the state of charge at slow-speed driving conditions.

Shift Point—The generally recognized point of generator changeover to 12-volts is a demand of 400 watts. By 1958 it is estimated that demand will be close to 500 watts. On the score of generator demand alone, a good case could have been made for the switch.

Improved electrical distribution also is an advantage. The trend to higher electrical loads with the 6-volt system presented increasing cost and installation problems to auto engineers. Larger cables and better switches had to be provided to handle the high currents with the low voltage drops allowable, and the use of slip and spring-loaded connections had to be restricted.

Smaller Wire — With the lower currents of the 12-volt system, wire sizes of the larger cables can be reduced four to six gages. Extended use of slip and spring-loaded connections will help lower assembly time, with connections less vulnerable to loosening.

Any of these advantages might have been sufficient reason to make the switch to 12 volts feasible. The basic one: To fire an engine with an 8.5:1 compression ratio or higher, it takes more at the secondary of the ignition coil, and that means more at the primary. The reason Delco-Remy engineers felt confident of their proposal was that they knew about GM's program of high-compression engines coming along. Their reluctance to talk about this program contributed to the attitude of many that 12 volts were a luxury rather than a necessity.

24 Volts Next?—How long will 12 volts do the job? Just as 6 volts are limited to about 8.5:1 compression ratios, 12 volts may not be enough somewhere between 10.5 and 12:1. The next logical step would be to 24 volts, all other things being equal.

Don't look for that to happen real quick, however. Now in the works throughout the industry is a move to larger displacement engines to get more power. Compression ratios will continue to go up but probably not so fast as during the last five years. Larger bores and strokes will contribute the torque that means performance, as in the case of the remake Cadillac engine for 1956.

Fuels, Too—It's not unlikely that 24-volt ignition may be coming along one of these days, but don't bet on it. Gasoline seems to run out of wallop at about 12.5:1, and that would mean a switch to another type of fuel. Chances are pretty good that 12 volts will see the automakers through to the turbine.

But ampere output is likely to go up for some time. Delco-Remy is working on a program of 35-ampere generators, compared with today's 30 amps and yesterday's 20 amps. That's the story of generator demand, however, rather than ignition.

Auto, Truck Output

U. S. and Canada

	1955	1954
January	780,780	594,467
February	770,530	574,215
March	955,027	672,858
April	936,994	676,269
May	913,257	621,318
June	825,031†	635,540
July	805,000*	543,540
August		523,799
September		364,441
October		312,078
November		616,395
December		761,954
Total		6,896,874
Week Ended	**1955**	**1954**
July 2	195,071	133,141
July 9	167,288	106,169
July 16	207,627	130,757
July 23	208,413	130,744
July 30	200,913†	130,523
Aug. 6	189,000*	124,168

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

GM Shows Sun-Powered Car

A model automobile powered by light will be demonstrated at General Motors' Powerama in Chicago next month. The 15-in. car has 12 photoelectric cells which convert light into electric current. A tiny electric motor powers the car.

A possible power source of the future, solar power has no practical application in the automotive industry at present, GM officials say.

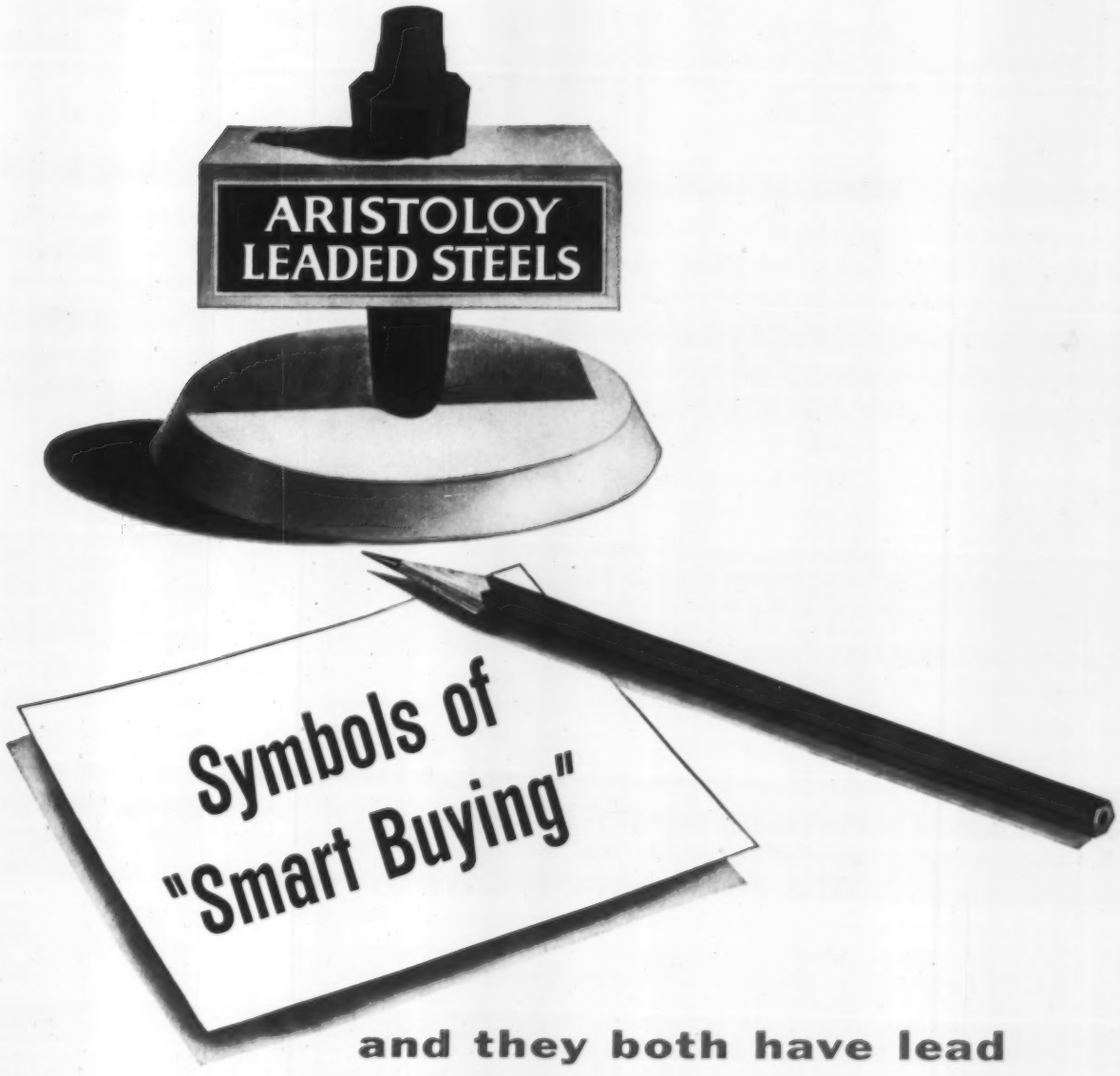
Other highlights of the show: A lightweight train built by GM at the request of railroad officials, demonstrations of diesel and gas turbine engines and scores of exhibits including huge earth movers, dump trucks, oil drilling rigs, a cotton gin, a saw mill, a submarine, airplanes and Army tanks.

Exhaust Notes

As General Motors announces all divisions set records during the first 20 days of July in both new and used-car sales (as they did from Jan. 1 to July 20), Ford says it will be going to two-shift passenger car production at the Dearborn assembly plant. That means output of 1040 cars daily, compared with today's 600 on one shift.

For the record: The Automobile Manufacturers' Association confirms that a record 4,863,333 vehicles, including 4,226,729 passenger cars, were produced during the first six months of 1955.

You'll be delighted to learn that Cadillac supplies a remote control trunk lid lock which permits a motorist to unlock his trunk without getting out of his car. No automatic trunk loader and unloader, however. The doorman does that.



and they both have lead

Today's Purchasing Agent is recognized as part of the executive management team. Why? Because the modern PA, using value analysis, is looking beyond initial cost to specify products that can be purchased to be produced at a profit.

Parts machined from Ledloy* give production line savings.

Freer machining, faster feeds and speeds and longer tool life add value through each manufacturing step.

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The end result—a total saving accumulated step by step from rough stock to finished product that makes Ledloy a "smart buy."

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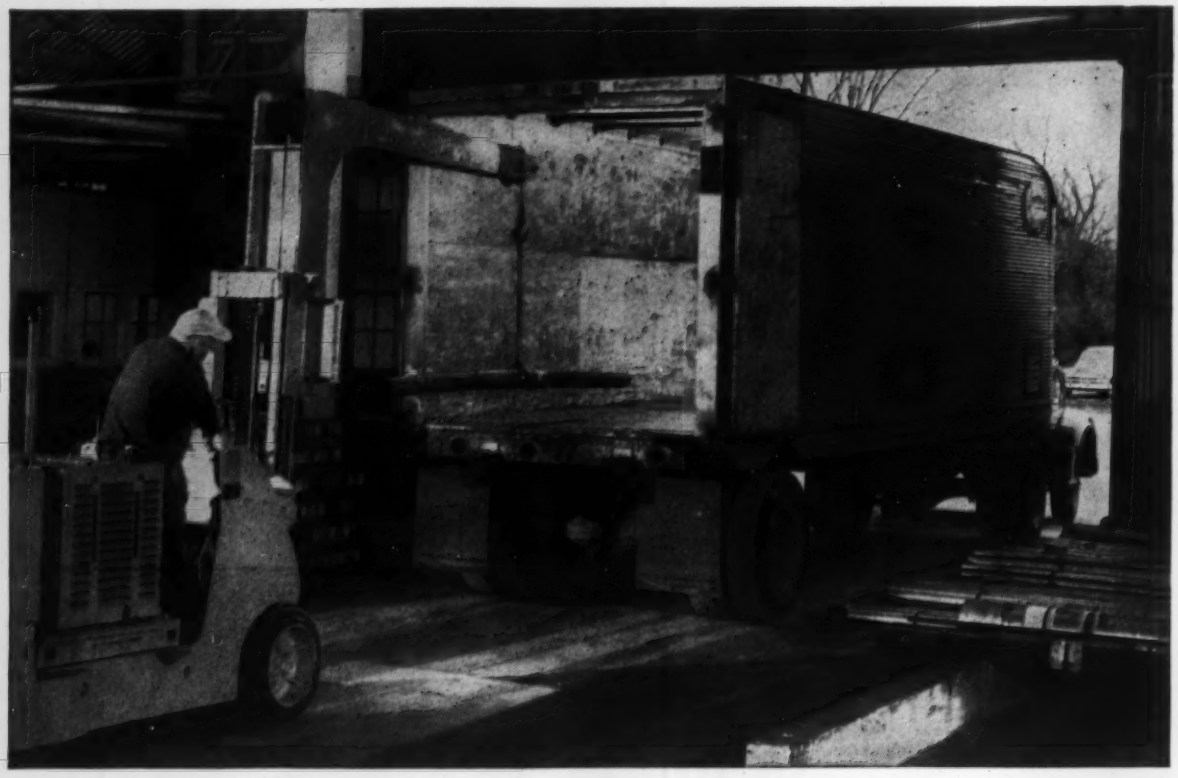

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The Timken Company is America's pioneer producer of 52100 tubing. And we're the only company that makes 52100 steel in tubing, bars and wire. Our unequaled experience assures you of uniform quality from tube to tube and heat to heat.

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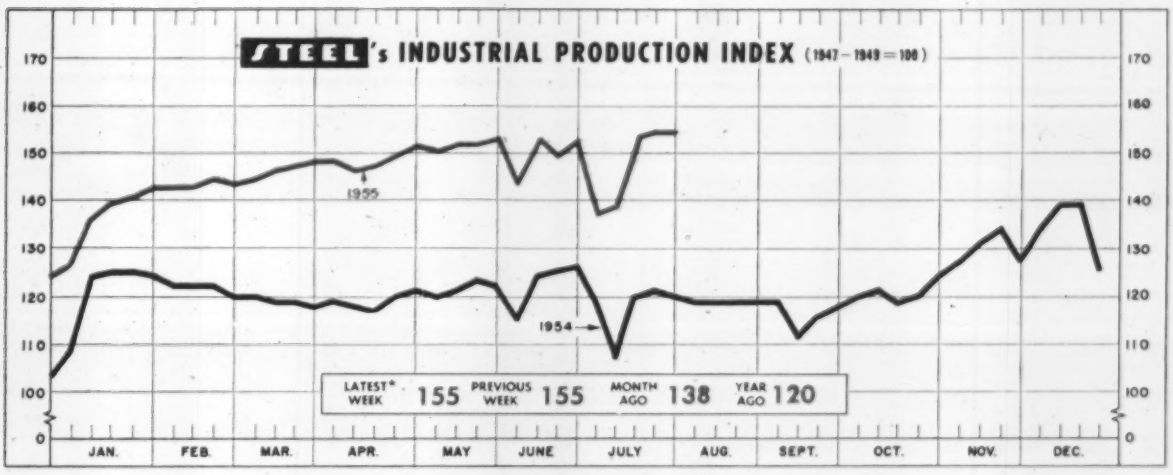
YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



*Week ended July 30. Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Auto Assemblies 11%.

High Borrowing Means Tighter Credit

LOOK FOR tighter credit ahead. A trend has been building in that direction for several months. Biggest step, and a likely indicator of more to come, was last week's clamp-down on home loan terms by FHA and VA—larger down payments, shorter repayment times.

Other signs: Consumer installment credit has been increasing by about $500 million a month (seasonally adjusted). Continuing high auto sales and buying of major household items make it look like that pace is being maintained. Pressure on auto dealers to clear out 1955 models will act as a sustaining force.

Autumn — Demand for home loans has tapered off, but is still running on a high plateau, about one-third ahead of last year's. Opinion is divided on how much of a dent the recent FHA-VA action will make. Since loan applications in process aren't affected by the change, the effects won't show up until fall.

Business demands for expansion plans, new equipment and diversification will continue high. The trend is well defined by first-half borrowings which rose sharply at a time when they normally decline. The fall upswing just ahead will be an added fillip. Pressure to build inventories in the face of better business may add to the borrowing activities.

Government—Another factor in the mounting demand will be the federal government's need for funds to take care of the usual second-half deficit.

It's the old law of supply and demand—more borrowers mean lenders can be more choosy, get more interest on what they lend.

Underneath the whole business upswing is the continuing spending by the consumer. His average take home pay is at near record levels; so is his purchasing power.

That's one of the reasons why there's so much difference of opinion on the question: Do people owe too much? Those who say

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,278[1]	2,190	1,527
Electric Power Distributed (million kw-hr)	10,550[1]	10,620	1,172
Bitum. Coal Output (1000 tons)	9,415	9,730	7,390
Petroleum Production (daily avg.—1000 bbl)	6,636[1]	6,650	6,255
Construction Volume (*ENR*—millions)	$366.2	$360.7	$262.3
Automobile, Truck Output (*Ward's*—units)	200,913[1]	208,413	130,523
TRADE			
Freight Car Loadings (1000 cars)	790[1]	786	684
Business Failures (Dun & Bradstreet, no.)	188[1]	172	195
Currency in Circulation (millions)[3]	$30,157	$30,287	$29,776
Dept. Store Sales (changes from year ago)[3]	12%	+4%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,421	$21,369	$18,303
Federal Gross Debt (billions)	$277.3	$276.3	$270.8
Bond Volume, NYSE (millions)	$18.6	$19.3	$18.3
Stocks Sales, NYSE (thousands of shares)	11,165	11,582	13,049
Loans and Investments (billions)[4]	$85.2	$84.0	$81.1
U. S. Govt. Obligations Held (billions)[4]	$32.6	$31.7	$34.0
PRICES			
STEEL's Finished Steel Price Index[5]	207.63[1]	207.65	195.87
STEEL's Nonferrous Metal Price Index[6]	240.2	240.2	215.4
All Commodities[7]	109.9	110.0	109.7
Commodities Other than Farm & Foods[7]	116.3	116.3	114.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278. 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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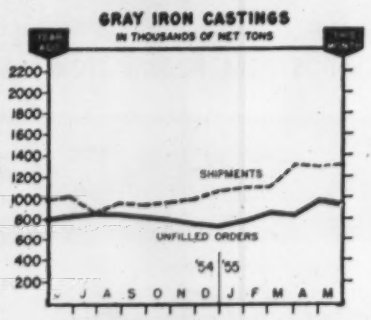
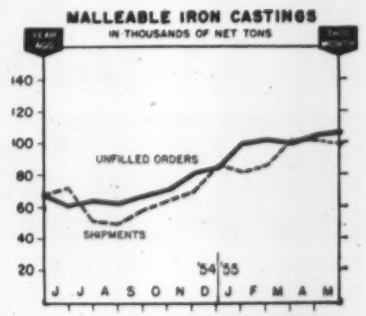
THE BUSINESS TREND



	Shipments		Unfilled Orders*	
	1955	1954	1955	1954
Jan.	1,092	932	783	872
Feb.	1,106	936	852	865
Mar.	1,315	1,047	842	842
Apr.	1,294	995	966	826
May	1,310	943	938	775
June	....	987	...	804
July	....	821	...	829
Aug.	....	935	...	830
Sept.	....	921	...	811
Oct.	....	942	...	789
Nov.	....	997	...	760
Dec.	....	1,074	...	745
Total	....	11,530		

*For sale. U. S. Bureau of the Census.
Charts copyrighted, 1955, STEEL.



	Shipments		Unfilled Orders*	
	1955	1954	1955	1954
Jan.	82.0	70.3	99.8	85.6
Feb.	86.0	69.1	101.8	81.6
Mar.	102.4	84.3	99.7	74.2
Apr.	101.2	74.5	104.1	69.1
May	98.4	67.9	106.4	67.0
June	....	72.8	....	60.2
July	....	50.9	....	63.7
Aug.	....	59.3	....	62.5
Sept.	....	58.0	....	66.7
Oct.	....	64.3	....	71.1
Nov.	....	70.0	....	80.7
Dec.	....	87.9	....	85.1
Total	....	829.3		

*For sale. U. S. Bureau of the Census.

no point to high employment and earnings. Those who say yes figure the higher the debt the more serious the trouble should there be any appreciable slowdown in business. They'd like to slow things down a little now rather than risk a bigger dip in a year or so.

Executives Optimistic . . .

Metalworking, winding up one of the best first halves it has ever had, is, in general, confident of a continuation of good business for the rest of the year.

"We have every reason to believe that the strong consumer purchasing which we have witnessed for the last six months will continue, uninterrupted by any foreseeable factor, for the remainder of this year," comments John H. Ashbaugh, vice president and general manager of Westinghouse Electric Corp.'s Electric Appliance Division. Sales of the company's major electric appliances set records in the first half, were 25 per cent ahead of the first half of last year.

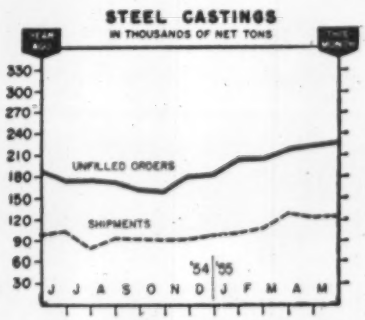
In capital equipment, W. Cordes Snyder Jr., president, Blaw-Knox Co., states that new business in some lines shows greater strength than at any time in the past year. Notable pickups are in equipment for the steel industry, highway paving equipment, dairy equipment and engineering contracts for the chemical process industries.

Orders, Shipments High . . .

"The outlook for the second half of 1955 indicates that the current rate of orders and a high rate of shipments will be sustained," report W. B. Given Jr., chairman, and Kempton Dunn, president, American Brake Shoe Co. Second-quarter shipments were up 41 per cent from those last year. Incoming orders are "at a high rate."

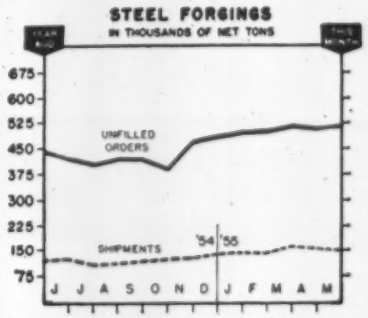
Burroughs Corp. records the highest first-half rate of incoming orders in the firm's history. The outlook is bright for the balance of the year.

W. C. Keeley, president, Vanadium Corp. of America says: "The volume of unfilled orders on hand, plus a continued high level of incoming orders, lends promise to the outlook for sales and earnings for the immediate future." The company shattered all previous sales and earnings records in the first half.



	Shipments		Unfilled Orders*	
	1955	1954	1955	1954
Jan.	98.2	122.8	201.8	251.8
Feb.	106.4	116.5	202.3	234.6
Mar.	127.5	122.3	215.1	214.3
Apr.	120.1	105.8	221.3	197.9
May	122.5	94.6	225.3	182.5
June	....	100.0	....	169.6
July	....	75.8	....	170.6
Aug.	....	89.6	....	168.3
Sept.	....	88.4	....	158.8
Oct.	....	87.1	....	154.1
Nov.	....	87.7	....	175.7
Dec.	....	93.5	....	179.1
Total	....	1,184.1		

*For sale. U. S. Bureau of the Census.



	Shipments		Unfilled Orders	
	1955	1954	1955	1954
Jan.	136	139	488	638
Feb.	135	127	492	539
Mar.	154	130	507	487
Apr.	150	116	499	460
May	147	107	509	431
June	....	113	....	409
July	....	97	....	395
Aug.	....	102	....	410
Sept.	....	109	....	409
Oct.	....	113	....	382
Nov.	....	120	....	461
Dec.	....	129	....	473

U. S. Bureau of the Census. Data based on reports from commercial and captive forge plants with monthly shipments of 50 tons or more.

Midvale Co. reports incoming orders in the second quarter almost doubled those of first quarter and notes: "The improvement has carried forward through the month of July."

Broad Base for Confidence . . .

On a broader basis, metalworking trade associations report continuing good, even excellent business.

Machine tool orders in June were $77.8 million, highest for any month since August, 1953. June shipments ran $58.7 million, second best month this year, reports National Machine Tool Builders' Association.

Reflecting the continued high level of construction, June bookings of fabricated structural steel were 318,150 tons, highest for the industry since April, 1951. Bookings for the first half of the year were 33 per cent above the first half of 1954, states American Institute of Steel Construction.

Metal Treating Institute records billings of commercial heat treaters in June at 24 per cent ahead of last year's. To date, billings are up 6.7 per cent.

June shipments of screw machine products were highest since October, 1953, announces the National Screw Machine Products Association. Orders for the month were 54 per cent higher than that month last year. For first half, shipments were up 21 per cent; new orders, 58 per cent.

Volume in the gearing industry dipped 5.7 per cent in June, but, except for May, was the highest month since October, 1953. The American Gear Manufacturers Association index was 193.5 (1947-1949=100), compared with only 127.4 a year ago. Volume in first half was 26.6 per cent ahead of that period last year.

New Peaks . . .

New orders for industrial supplies and machinery hit the highest point since the Korean War months, January to April, 1951. The American Supply & Machinery Manufacturers' Association Inc. index is 194.5, almost double the base month, July, 1948. The latest advance is close on the heels of the previous big jump between April and May.

Resistance Welder Manufacturers' Association announces orders for the first six months are 31 per cent ahead of the first half of 1954.

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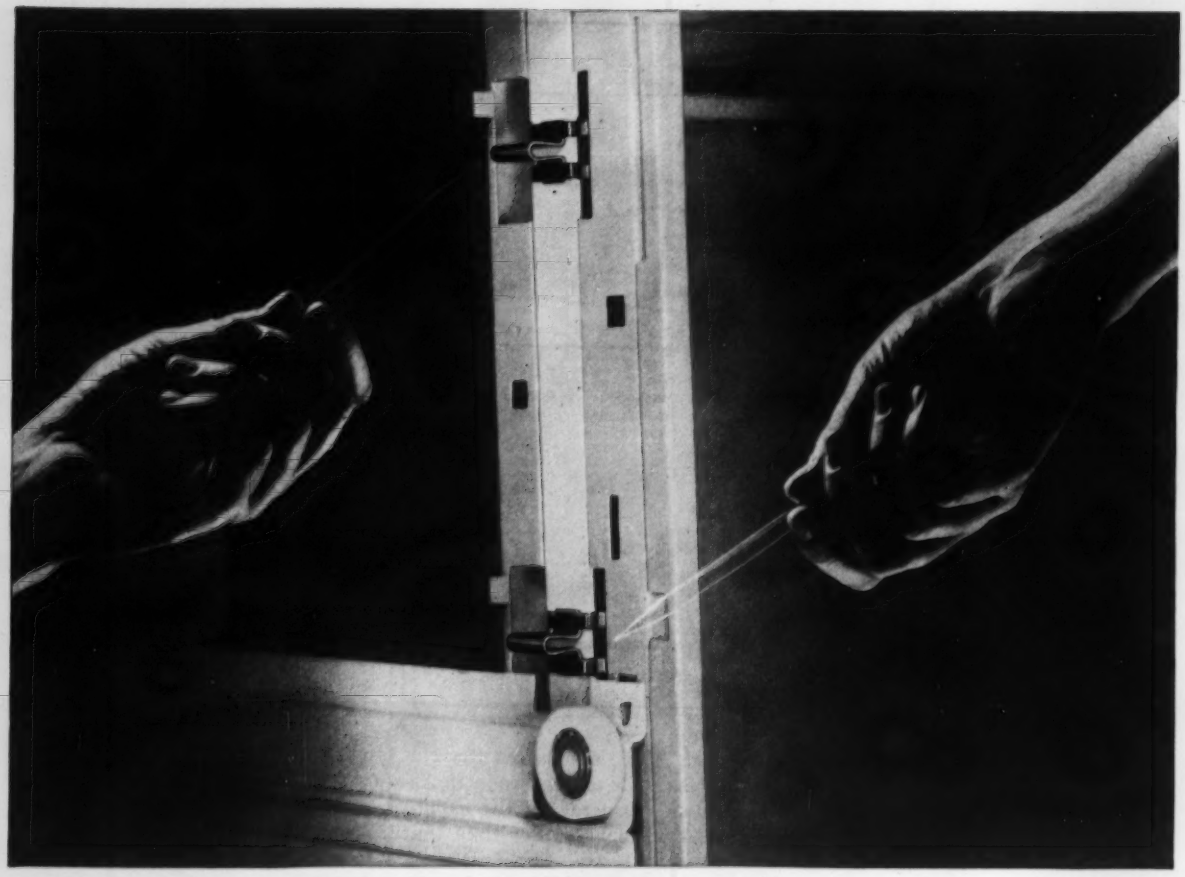


Engineered by Tinnerman . . .

THIS SPEED CLIP® GIVES DESK LINE EXTRA MODEL FLEXIBILITY . . . and saves money!

Here's the special SPEED CLIP that enabled the General Fireproofing Company, Youngstown, Ohio, to build maximum flexibility into its new "Generalaire" office furniture. A relatively small number of basic units can be interchanged to produce 46 different desk and table models. General Fireproofing reduces manufacturing and shipping costs; dealers have fewer parts to stock and handle!

This one-piece, spring-steel SPEED CLIP snaps easily and quickly into place by hand. It replaces a costly five-piece locking bar latch mechanism that had to be factory-installed in left- and right-hand assemblies. Now, SPEED CLIPS make it possible to ship knockdown locking bars to dealers who then build left- and right-hand assemblies from basic units to fill customers' orders. What's more, Generalaire desks are assembled throughout with 20 or more SPEED NUT brand fasteners which contribute greatly to this flexibility.

A free Tinnerman Fastening Analysis of your products may show similar assembly advantages with important production savings. See your Tinnerman representative soon and write for Fastening Analysis Service Bulletin No. 336.

TINNERMAN PRODUCTS, INC., Box 6688, Dept. 12, Cleveland 1, Ohio

Canada: Dominion Fasteners, Ltd., Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Ltd., Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse, Levallois, (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

TINNERMAN **Speed Nuts®**

FASTEST THING IN FASTENINGS®

FREDERICK T. SCOTT
. . . dept. mkt. mgr. at General Electric

R. F. EDGAR
. . . Warner Electric's ind. sales mgr.

CHARLES F. TRAPP JR.
. . . sales manager at Formsprag Co.

Frederick T. Scott was made manager of marketing, industry control department, **General Electric Co.**, Schenectady, N. Y. He succeeds **J. T. Bailey,** named manager, outdoor lighting department, Lynn, Mass.

Leonard F. Swoyer was named eastern regional sales manager, **New Departure Division,** Bristol, Conn., General Motors Corp. He succeeds **Robert H. Wilkie** who became merchandising manager, sales organization.

Acme Stamping & Mfg. Co., Pittsburgh, named **Rudolph L. Schrei** president succeeding the late **Charles A. Kays; Fred W. Hartsorn** vice president - production manager; and **Herman J. Wilhelm,** secretary and treasurer.

Tracy Griswold was appointed to the new post of assistant sales manager, **Erie Enameling Co.**, Erie, Pa. He was chief estimator.

Robert L. Purcell was elected vice president, **Siegler Corp.**, Chicago. He was executive vice president, New York Shipbuilding Corp., and general manager of its Nesco Division, Milwaukee.

Jones & Lamson Machine Co., Springfield, Vt., appointed **George R. Morin,** chief sales engineer, as manager of industrial engineering, marketing division.

Warner Electric Brake & Clutch Co., Beloit, Wis., appointed **R. F. Edgar** industrial sales manager. Formerly midwest regional manager, he is responsible for planning and controlling marketing functions.

Aluminum Co. of America, Pittsburgh, appointed **Robert L. Williamson** manager of pig and ingot sales and **John S. Hamilton** manager of foil product sales. Mr. Williamson was manager of die castings and Mr. Hamilton manager of packaging foil sales.

Wheeling Steel Corp., Wheeling, W. Va., named **J. Gordon Hutchinson** comptroller to succeed the late **R. D. Swinburne.**

Ray Milliron was made general manager, **ConRay Corp.**, manufacturing and electronic division of Continental Tooling Service Inc., Dayton, O.

Donald G. Clark was appointed vice president-sales, **Allied Oil Co.**, Cleveland, division of Ashland Oil & Refining Co.

William L. Pharmer was made assistant sales manager, Electro Dynamic Division, **General Dynamics Corp.**, Bayonne, N. J.

Robert L. Murman was named Detroit district sales manager, **Wright Hoist Division,** York, Pa., American Chain & Cable Co., Inc.

Charles F. Trapp Jr. was appointed sales manager, effective Aug. 15, **Formsprag Co.**, Van Dyke, Mich. Formerly, he was area sales manager in the apparatus division, Westinghouse Electric Corp.

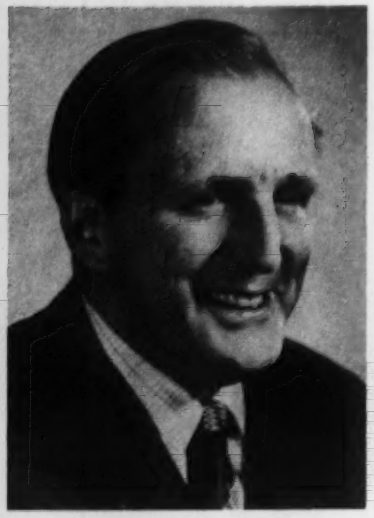
Grinding wheel division of **Electro Refractories & Abrasives Corp.**, Buffalo, created three new district manager positions: **Carryl A. Asher,** vice president, is eastern sales manager; **A. D. Stover,** Detroit district manager; and **John Hume Jr.**, Chicago district manager.

Frederick J. Lanz and **John P. Finn,** former sales engineers, were promoted to vice presidents, **Harrington Machinery Inc.**, West Hartford, Conn.

Lauris L. Grant was appointed manager of the machinery electrification section of the industrial sales department, apparatus division, **Westinghouse Electric Corp.**, Pittsburgh, Pa.

Marvin H. Pond joined the **Keystone Ridgeway Corp.**, Gettysburg, Pa., as technical director. He was assistant chief research metallurgist at the New Haven, Conn., plant of the Olin Mathieson Chemical Corp.

Edward J. Caffery was named manager of industrial sales and products and **Raymond Bolton,** manager of sheet metal sales and



GEORGE DOLAN
. . . Kennametal Pacific Coast mgr.

CLYDE H. WILKINSON
. . . American-Standard div. products mgr.

products at the Rochester plant of **Follansbee Metals Corp.**

George Dolan was named manager of the newly formed Pacific Coast region, **Kennametal Inc.**, Latrobe, Pa. He was northwest district manager.

E. C. Benzing Jr. was assigned as Chicago district manager, **Bellows Co.**, Akron, O.

Chas. Pfizer and Co. Inc., New York, announces three promotions in the Technical Service department: **Richard A. Benedict**, manager-industrial biotics section; **Dr. Robert C. Ottke**, manager-development section; and **John K. Shaw**, manager-industrial section.

Frank B. Snedecor was appointed manager of Niagara Falls plant, **Titanium Alloy Manufacturing Division**, National Lead Co. Formerly assistant to the division manager and controller, he succeeds **Robert B. Easton**, retired.

Roy H. Winn was made district sales manager at Detroit, **Taft-Peirce Mfg. Co.**, Woonsocket, R. I. He is succeeded as midwestern air gage sales engineer by **F. Curtis Fales.**

Charles W. Lee was promoted from vice president and general manager to president, **Consolidated Western Steel Division**, Los Angeles, U. S. Steel Corp. He succeeds **Alden G. Roach**, president, Columbia-Geneva Steel Division.

Clyde H. Wilkinson was appointed manager-water heater products, plumbing and heating division, **American Radiator & Standard Sanitary Corp.**, Pittsburgh. He was manager-water heaters, Bryant Division, Carrier Corp., Cleveland.

Glenn O. Logan was promoted to Atlanta sales division manager, Cleco Division, **Reed Roller Bit Co.**, Houston. He has been a special salesman since 1948 in the Atlanta area.

Frank D. Skelley was named contract liaison manager, **Houdaille-Hershey of Indiana Inc.**, with headquarters at Ridgefield, N. J. He will handle government contracts and special assignments.

Harold A. Muehlbeck was made industrial sales manager, **Pontiac Varnish Co.**, Pontiac, Mich.

Charles A. Peters was promoted to the new post of controller, **A. Finkl & Sons Co.**, Chicago. He was chief accountant for seven years.

D. W. Berry was appointed assistant chief engineer, aviation gas turbine division, Kansas City, Mo., **Westinghouse Electric Corp.** He will remain director of development.

W. H. Hoback joined **National Lead Co.**, New York, as an assistant to the director of research.

Samuel D. Richards was appointed assistant to the treasurer, **Clark Equipment Co.**, Buchanan, Mich.

Ray A. Tritten was made assistant to the general manager of the West Coast divisions of **Carrier Corp.**, Syracuse, N. Y.

Robert J. Sudlow was made New England district representative for **Frank G. Hough Co.**, Libertyville, Ill.

Jess A. McMurry was named director of branches for **Crane Co.**, Chicago. He was district manager at Dallas.

Norton Co. appointed **Robert H. Langdon** district manager for New York and northern New Jersey. He is replaced by **John W. Wheeler** as abrasive engineer serving the western Massachusetts area.

Wheeling Corrugating Co., Wheeling, W. Va., appointed **James Bagot** manager of the New Orleans warehouse and sales offices.

Willis H. Guinn was made controller of **Ford Aircraft Engine Division**, Chicago, Ford Motor Co., replacing **J. Franklin Mellema**, recently named divisional administration manager.

General Motors Acceptance Corp. named **J. D. Deane** executive vice president-operating staff, succeeding **August Freise**, retired. **Gavin Brackenridge**, vice president, succeeds Mr. Deane as executive in charge of branch operations in the U. S. and Canada.

Charles C. Irwin Jr. was appointed staff assistant to the vice president-sales, **U. S. Spring & Rubber Co.**, Los Angeles.

Arthur C. Correll was made assistant district sales manager at Waukegan, Ill., for **Cyclone Fence Department**, American Steel & Wire Division, U. S. Steel Corp.

John A. McAdams, formerly general accounting manager, was named an assistant treasurer, **SKF Industries Inc.**, Philadelphia. **Frederick G. Roberts** retired as company assistant treasurer.

Alonzo B. Kight was elected vice president, **Borg-Warner International Corp.**, export subsidiary of Borg-Warner Corp. He was ad-

ANOTHER EXAMPLE of
REDUCING COSTS WITH—

Buhr ECONOMATION

Mills, core-drills, drills, countersinks and individual-lead-screw taps 206 intake manifolds an hour gross!

Economy and auto*mation* are combined in this Special to form another example of the way Buhr *Economation* reduces production costs for leading manufacturers.

This 6-way dial-type hydraulic-feed Buhr Special is equipped with a 72″-diameter 8-position automatic index table, complete with shot bolt.

Chip disposal is accomplished by an automatic rotating chip conveyor, attached to index.

Operations formerly accomplished by eight machines were combined in this Buhr Special —and volume of production was increased! . . . A typical example of Buhr Economation!

Buhr

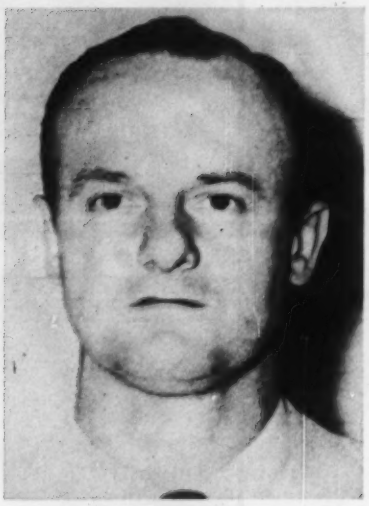
MULTIPLE-SPINDLE
HIGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

BUHR MACHINE TOOL CO.©
ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers

STEPHEN B. METCALFE
. . . American Steel & Wire dist. mgr.



ARNOLD ARMSTRONG
. . . Portland Copper & Tank Works post

ministrative assistant to the president.

Stephen B. Metcalfe was named Worcester district manager of operations, **American Steel & Wire Division**, U. S. Steel Corp., succeeding **George A. Gleason** who is retiring. He was assistant district manager.

W. H. Yahn was named general manager of **North American Aviation's** Fresno, Calif., modification center.

J. A. Zurn Mfg. Co., Erie, Pa., named **L. W. White** vice president, **Zurn Services Inc.**, New York.

Brooks & Perkins, Detroit, named **Charles I. Vogel**, former general sales manager, to the new post of vice president-sales. **Harry P. Dunne**, former New York office manager, succeeded Vogel.

Arnold Armstrong was made superintendent, jet engine component production division, **Portland Copper & Tank Works Inc.**, Portland, Me.

Fisher Body Division, General Motors Corp., named **R. H. Gathman** manager of the stamping plant to be built at Mansfield, O. He was executive assistant to **S. J. Sabourin**, general factory manager.

Samuel S. Crandell was promoted to Chicago plant office manager, **Joseph T. Ryerson & Son Inc.** He succeeds **Richard J. Oetking** who resigned to enter the construction business.

Koehring Co., Milwaukee, appointed **R. E. Burton** assistant general sales manager. He succeeds **M. O. Messenger**, named vice president and sales manager for Koehring's Canadian subsidiary, Koehring-Waterous Ltd., Brantford, Ont.

Roy E. Swingle was appointed manager of the shippers laboratory, **Acme Steel Co.**, Chicago, succeeding the late **L. G. Horvath.**

Robert S. First was made assistant to the director of market research, **National Lead Co.**, New York. He was manager of market research, plastics division, Celanese Corp.

Parker Appliance Co., Cleveland, named **R. N. Boucher** as special representative to contact U. S. government facilities. He had been in the New York district as a sales engineer.

Acheson Colloids Co., Port Huron, Mich., named **Fred Zajac** as Detroit service engineer, replacing **Frank M. Hunter** who will supervise the laboratory phase of its sales engineering program.

John C. Miller, former executive vice president, was named president, **Berlin Chapman Co.**, Berlin, Wis. Other officers elected: **John B. Gillett**, vice president-sales; **Harold Warner**, vice president-foundry; **Albert J. Blum**, vice president; **George Devere**, controller-treasurer; and **Walter J. Patri**, secretary. Named directors were **W. Mead Stillman, Mr. Miller, Mr. Blum, John F. Crosby, Joseph L. Smith, George A. Horton** and **J. W. Morris.**

C. M. Reagle was assigned as New York domestic territory manager, **Cooper-Bessemer Corp.**, Mt. Vernon, O. He is also a vice president and director, and manager of marine sales.

OBITUARIES . . .

Peter J. Soffel, 63, president, **Pittsburgh Metals Purifying Co.**, Pittsburgh, died July 9.

Charles W. Dunlap, 70, chief advisory and consulting engineer, **Plibrico Co.**, Chicago, died July 19.

DeWitt McKinley Emery, 59, president, **National Small Business Men's Association**, died July 22.

Frank J. Hughes, 58, director of contracts, **Crosley Division**, Avco Mfg. Corp., New York, died July 20.

B. Frank Stoner, 83, retired chief engineer, **Baker - Raulang Co.**, Cleveland, died June 13.

John Kloos, 83, retired field service manager, **Morgan Engineering Co.**, Alliance, O., died July 15.

John H. Collier, 70, former president and chairman, **Crane Co.**, Chicago, died July 27.

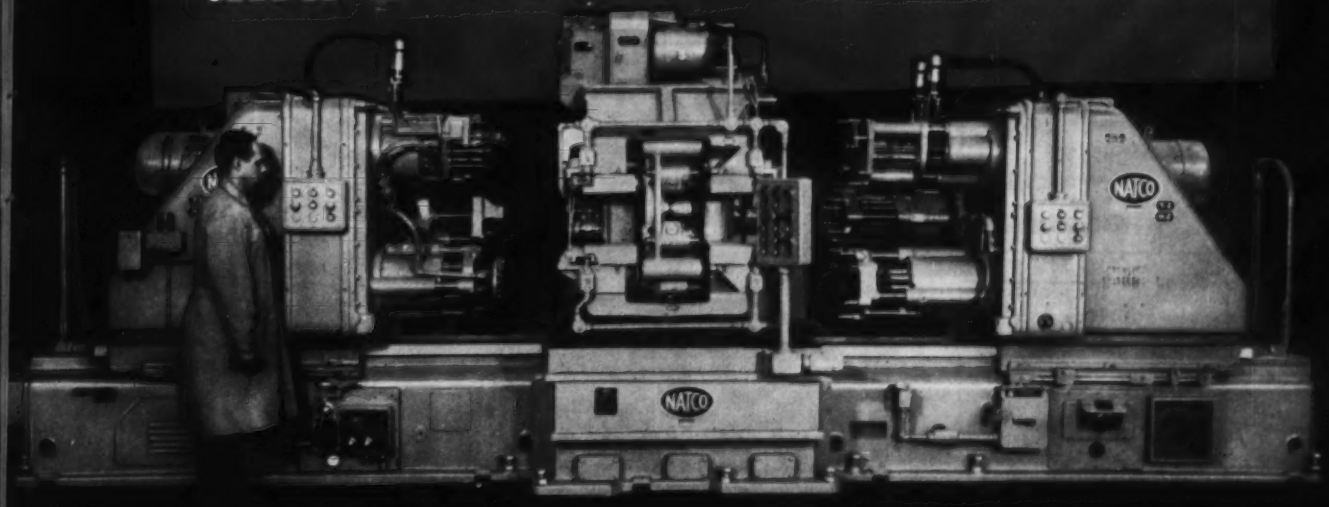
Alexander H. Rutherford, 78, director, **Revere Copper & Brass Inc.**, New York, died July 22.

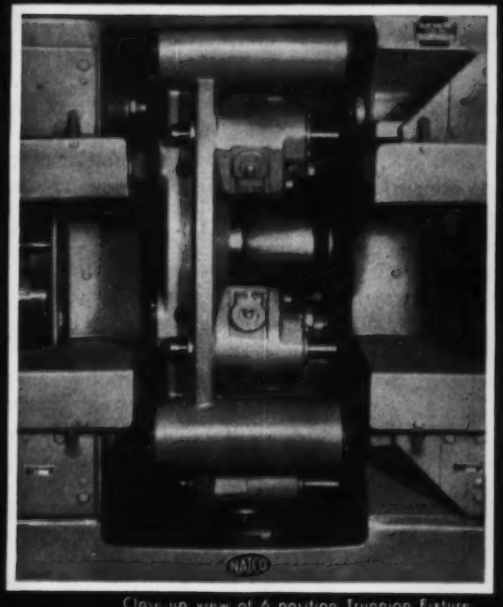
Lowell J. Ruprecht, 49, president, **Exact Metal Specialties Co.**, Chicago, died July 19.

Howard E. Johnson Sr., 53, chief engineer, **American Manganese Steel Division**, American Brake Shoe Co., Chicago Heights, Ill., died July 24.

Arthur H. Churchill, 93, retired cashier, **Phelps-Dodge Corp.**, New York, died July 23.

COMBINING OPERATIONS on a NATCO Cut Costs and Increased Production!



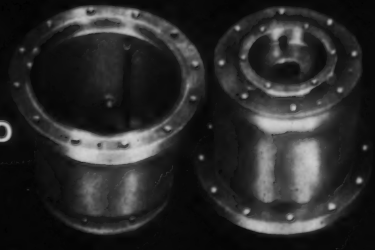


Close up view of 6 position Trunnion Fixture

109 REFRIGERATOR COMPRESSOR SHELLS PER HOUR

Estimated Gross Production

DRILLED
COUNTERBORED
REAMED, TAPPED
CHAMFERED
BURRED



Total . . . . . 77 OPERATIONS

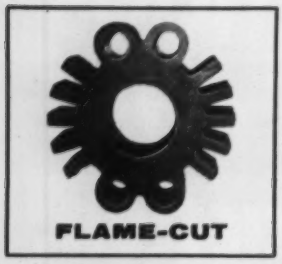
NATIONAL AUTOMATIC TOOL COMPANY, INC.
RICHMOND, INDIANA

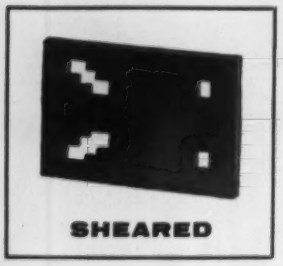
for problems in Drilling, Boring, Facing and Tapping

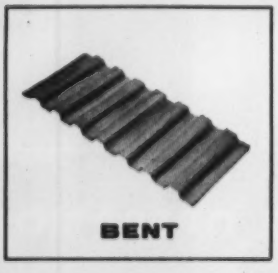
Call a Natco Field Engineer

CHICAGO, Room 203, 6429 W. North Ave., Oak Park
DETROIT, 10138 W. McNichols Rd.
BUFFALO, 1807 Elmwood Ave.
NEW YORK, 35 Beechwood Ave., Mount Vernon

NATCO







LUKENS

How much is it costing you?

STEEL PLATE SHAPES SERVICE CAN HELP YOU CUT SCRAP, INVENTORY AND FREIGHT COSTS

If you're searching for ways to pare production costs, look at pre-formed parts. Savings of 5% to 25% are possible when you buy components already shaped from rolled carbon, alloy or clad steel plate.

With By-Products Steel Co.'s Steel Plate Shapes Service, you pay freight only on material you will use. Plate inventories can be reduced and scrap problems virtually eliminated, saving both dollars and space.

Equipment builders find consistent savings right down the line with preformed parts. A wide range of finishes, from as-formed to finish-machined, saves production steps. No costly patterns are needed; Steel Plate Shapes Service works directly from blueprints. Over 150 major machines are available to flame-cut, shear, bend, blank or press your parts.

Located next to the mills of the world's leading producer of specialty steel plate, we can work from plates up to 195" wide or 25" thick, form and heat treat them to your specifications. If you wish to find out how you can use this unique service to cut your production costs, write on your letterhead for Bulletin 712. Address: By-Products Steel Company, 742 Strode Avenue, Coatesville, Pennsylvania.

STEEL PLATE SHAPES SERVICE

BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania

Steel Merger Pends

Advantages seen in plan to unite Vanadium-Alloys Steel Co. and Pittsburgh Tool Steel Wire Co.

A NEW TREND in the expanding steel business is seen in the proposed merger of Vanadium-Alloys Steel Co., Latrobe, Pa., and Pittsburgh Tool Steel Wire Co., Monaca, Pa. Combining the noncompetitive companies would enable each to provide its customers with better service, says Roy C. McKenna, Vanadium-Alloys' board chairman.

Pittsburgh Tool's plant at Monaca is adjacent to the Colonial Steel Division of Vanadium-Alloys. There would be no change in the management of Pittsburgh Tool. The intention is to operate the plant independently.

Products of Pittsburgh Tool are precision finished bars, including ground squares and flat bars. Much of this material is generally made of oil hardening or air hardening tool steels which are produced by Vanadium-Alloys. They are sold by 330 distributors covering the United States.

Vanadium-Alloys' tool and die steels are sold nationwide through district offices and warehouses in principal cities.

Subsidiaries of Vanadium-Alloys Steel Co. include: Anchor Drawn Steel Co., Latrobe; Vanadium-Alloys Steel Canada Ltd., London, Ont.; Vanadium-Alloys Steel Societa Italiana, Turin, Italy. Associate firms are Compagnie des Forges de Chatillon, Commentry et Neuves-Maisons, Paris, France; and Nazionale "Cogne" Societa Italiana, Turin, Italy.

Harrisburg Steel Buys Firm

Harrisburg Steel Corp. and Precision Castings Co. have merged. Operating as a division of Harrisburg, Precision will expand its facilities, undertake plant improvements and broaden its design, engineering and sales forces. Precision is a producer of aluminum, magnesium and zinc diecastings. For Harrisburg, producer of high-pressure cylindrical containers for compressed gases, forgings, flanges and pipeline industry fittings, the merger signals another step in its diversification program. In 1953, Harrisburg Steel acquired Taylor-Wharton Iron & Steel Co. and Heckett Engineering Inc.

Grede Buys Seventh Foundry

Grede Foundries Inc., Milwaukee, purchased the Elkhart Division, Elkhart, Ind., of Chicago Hardware Foundry Co., North Chicago, Ill. The Elkhart foundry, seventh in the Grede organization, will produce gray iron castings.

Garfield Mfg. Adds Equipment

Garfield Mfg. Co., Garfield, N. J., increased the capacity of its hot molding plant by the addition of a line of transfer presses (ranging from 50 to 300 tons) and electronic equipment for preheating, preforming and finishing apparatus. The new facilities take their place alongside hot molding equipment with a capacity to 500 tons.

Detrex Corp. Opens Plant

Detrex Corp., Detroit, is operating its $1.5-million plant in Bowling Green, Ky., under the managership of P. H. Richey. It will produce dry-cleaning equipment, including the control and manufacture of some 5000 parts used in the assembly of dry-cleaning machines. The plant contains 100,000 sq ft of floor space. Production area in the Detroit plant, formerly devoted to the manufacture of dry cleaning equipment, will be used to expand production facilities of industrial equipment.

Electroweld Changes Hands

Electroweld Steel Corp., Azusa, Calif., manufacturer of steel tubing and steel furniture, has been purchased by Sears, Roebuck & Co., Chicago. C. W. Milligan was elected president of Electroweld.

Builds Aluminum Foundry

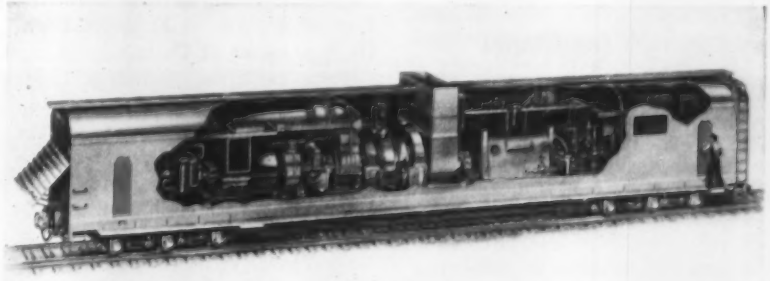
Anderson Brass Works Inc., Birmingham, is building an aluminum foundry at Leeds, Ala., with a working floor space of 12,000 sq ft. Some fabrication and heat-treating equipment will be installed.

Firm Renamed Buie Steel Corp.

H. R. Goeller Inc., Hillside, N. J., changed its name to Buie Steel Corp. The firm fabricates and erects structural steel and miscellaneous iron.

Hupp, Perfection To Merge

Stockholders of Hupp Corp. and Perfection Industries Inc. will meet Aug. 29 to vote on a proposed merger. The combined companies will have a diversity of products and markets. Aside from military items, Hupp is primarily a producer of components for other manufacturers, while Perfection is primarily a manufacturer of consumer items. Hupp has plants in Detroit and Chicago and is terminating the operations of its Globe Stamping Division in Cleveland. Perfection has plants in that city and is establishing one



Gas Turbines Get Nod for Mobile Power

Powered by combustion gas turbine, this mobile power plant delivers 5500 kw. It needs no water; only hookups are to fuel and transmission lines. The first plant was built for the U.S. Navy by Clark Bros. Co. Division, one of the Dresser industries, Olean, N.Y. A 6200-kw unit is being readied for Mexico. Gas turbine weighs 60 lb per kw compared with 75 for steam and 140 for diesel units

in Waynesboro, Ga. Perfection will continue as a division of Hupp.

Buys Kelley Island Co.

Basic Refractories Inc., Cleveland, purchased the White Rock, O., Gibsonburg, O., and Buffalo plants of Kelley Island Co., Cleveland, and related dolomite deposits, business, inventories, company name, patents and trademarks. The Kelley Island properties will be operated as a division of Basic.

Ball Bearings Firm Expands

New Hampshire Ball Bearings Inc., Peterborough, N. H., is constructing a 40,000-sq-ft plant at an estimated cost of $350,000. Orders have been placed for new machinery and equipment.

Equipment Maker Adds Plant

Air Products Inc., Emmaus, Pa., will begin operations soon in a Wilkes-Barre, Pa., plant, formerly occupied by Vulcan Iron Works. Gas processing, cutting and welding equipment will be made.

Sperry Rand Corp. Formed

Sperry Corp. has been consolidated with Remington Rand Inc. (STEEL, May 30, p. 63) to form Sperry Rand Corp., New York. The businesses formerly conducted by Ford Instrument Co. and New Holland Machine divisions of Sperry Corp. will continue to be operated as divisions of the consolidated firm.

Ferro Merges Subsidiaries

To streamline and integrate management and operations, Ferro Corp., Cleveland, merged three subsidiary firms in the Chicago area. Tuttle & Kift Inc., Chicago, becomes the corporate unit. Ferro Electric Products Inc., Kirkland, Ill., and Ferrod Mfg. Co., Batavia, Ill., become divisions. The companies make heating elements, switches, controls and other electrical components. John A. Sullivan is president of the consolidated operation; R. P. Blodgett, vice president of the Electric Range Division; D. V. Tuttle, vice president of the Ferro Electric Switch & Control Division; and H. F. Bond, vice president of the Ferrod Specialty Heating Unit Division.

"Talking" Elevator

ELEVATOR passengers at the National Distiller's building, New York, are hearing a phantom voice these days, but it's the elevator, not the "spirits," doing the talking.

Through the magic of magnetic tape messages, the electronic brains that control the operatorless elevators have been given the power of speech. Press the wrong button, and you are given "taped" instructions which are piped from the elevator machine room to concealed loudspeakers in the ceiling of the car.

The complex system, developed by Westinghouse Electric Corp., is capable, without supervision, of reproducing whatever messages are called for by traffic conditions—the basic unit provides four. Instructions are given when passengers do not follow proper procedure or when normal traffic is obstructed.

Wyman-Gordon, Prex Unite

Wyman-Gordon Co., Worcester, Mass., purchased a substantial interest in Prex Corp. Immediate expansion plans call for construction of a plant in Franklin Park, Ill., northwest of Chicago.

Prex facilities, including those of its Midland Die & Engraving Division, will be moved to the plant and will be augmented with additional production equipment. Completion of the facilities is scheduled for the third quarter of next year.

Midland Die & Engraving manufactures dies for the plastic industry and will carry on its operations in a section of the new plant.

Alloy Forgings — Prex Corp., originally an outgrowth of Midland Die & Engraving, has pioneered the development of small light alloy forgings without draft and with thin sections and close tolerances.

As a result of the affiliation, the productive capacity for the manufacture of small and medium-sized Prex forgings will be greatly increased. The Prex technique will be applied in the production of large light alloy forgings made by Wyman-Gordon on the heavy presses which it operates in the Air Force heavy press plant at North Grafton, Mass. The company also owns and operates a forging plant in Harvey, Ill., which services the automotive industry.

Hubbell Metals Expands

Hubbell Metals Inc. is adding 33,500 sq ft of space to its plant at 5400 N. Euclid Ave., St. Louis. This addition increases the plant's capacity 62 per cent to carry larger inventories of metals and to provide additional cutting equipment for them. The metal warehousing firm will open a plant in Memphis, Tenn., soon.

Van Norman Buys Super Tool

Van Norman Co., Springfield, Mass., purchased Super Tool Co., maker of carbide tools, with factories in Detroit and Elk Rapids, Mich. With Morse Twist Drill & Machine Co., New Bedford, Mass., and Super Tool as wholly owned subsidiaries, Van Norman now offers a complete line of high-speed, carbon and carbide tools. James Y. Scott, president of Van Norman and Morse, is chairman of the board of Super Tool Co.; Gordon Birgbauer remains as president; Charles F. Myers is vice president and director of sales; K. R. Fisher, sales manager.

Richmond Buys Pressed Metals

Assets of Pressed Metals of America Inc., Port Huron, Mich., have been sold, subject to stockholders' approval, to Frederick W. Richmond and associates. The automotive products manufacturing firm operates plants in Port Huron, Detroit and Marysville, Mich. Acron Products Corp., a wholly owned subsidiary, is included in the assets. John W. Leigh-

ton continues as board chairman and assumes the title of vice president, while John D. Leighton becomes president and chief executive officer. Other officers are: William Wade, vice president; W. Price Carson, secretary; Floyd Lock, treasurer; Edmund West, plant manager and assistant treasurer; R. J. Inman, counsel and assistant secretary.

Forms Barnes Engineering Co.

Olympic Development Co., Stamford, Conn., has been redesignated Barnes Engineering Co. as an independent engineering and manufacturing company. It formerly operated as a division of Olympic Radio & Television Co. The company produces infrared components and instrumentation for remote temperature measurements and control. Its wholly owned subsidiary, Multra Corp., makes automatic assembly machines. Other products include a device which automatically positions and controls the operation of machine tools and other industrial equipment and recording refractometers. Dr. R. Bowling Barnes is president.

Chelsea Products Expands

Chelsea Products Inc., Plainfield, N. J., manufacturer of fans and ventilating equipment, set up a Continental Appliance Division. It will market a new line of domestic window and floor fans to be made in a 75,000-sq-ft plant being built next to its main plant in Plainfield.

Stewart-Warner Buys Firm

Stewart-Warner Corp., Chicago, purchased John W. Hobbs Corp., Springfield, Ill., maker of electrical devices.

Vulcan Containers Inc. Formed

Vulcan Stamping & Mfg. Co. and Vulcan Tin Can Co. have been consolidated into a new organization, Vulcan Containers Inc. Both are under one roof and have the same officers, management and sales department. The company makes steel shipping containers, tin cans and container specialties.

ANNIVERSARIES

South Works of **United States Steel Corp.** will observe its 75th anniversary Aug. 17-18. Its steelmaking operations began Mar. 26, 1881. Employing 2000 persons then, it now has more than 14,000 on its payroll and ranks as the third largest steel mill in the world, with a capacity of nearly 5.5 million ingot tons annually. Oscar Pearson is general superintendent.

Crane Co., Chicago, is celebrating its 100th anniversary. The firm's business has expanded from the production of brass couplings and copper tips for lightning rods to a wide variety of products, including valves and fittings, kitchen, bathroom and heating equipment. A subsidiary makes titanium sponge and ingots.

ASSOCIATIONS

Officers of the **National Association of Fan Manufacturers Inc.**, Detroit, are: C. C. Cheyney, Buffalo Forge Co., Buffalo, president; R. W. Nelson, American Air Filter Co. Inc., Louisville, vice president; G. W. McCormick Jr., secretary-treasurer.

David M. Edwards, management specialist, has been appointed to head industrial management studies at **Battelle Memorial Institute**, Columbus, O.

John B. Davies, manager of industrial sales, Mine Safety Appliances Co., Pittsburgh, was elected president of **Industrial Safety Equipment Association**, New York.

Peter W. Schipper, general manager, Howard Foundry Co.'s Investment Casting Division, Milwaukee, has been named a director of the **Investment Casting Institute**, Chicago.

The **Steel Founders' Society of America**, Cleveland, established the Gustaf A. Lillieqvist Steel Foundry Facts Award. At his death, May 31, 1955, Dr. Lillieqvist was research director of American Steel Foundries and was intimately associated with the activities of the Steel Founders' Society of America as a member of its technical and research committee. The award will be made annually for the best paper published in *Steel Foundry Facts*, a monthly publication of steel casting technology.

NEW ADDRESSES

Scholtes & Keller Metal Products Co.—iron railings, steps and other metal products—moved into larger quarters at Reisterstown and Kingley roads, Owings Mills (Baltimore), Md.

Electric Controller & Mfg. Co., Cleveland, moved its Houston district office to Times Center Bldg., 2444 Times Blvd., Houston 5, Tex. C. A. Mitchell continues as district manager.

Sutton Engineering Co. established its executive and sales offices in the First National Bank Bldg., Pittsburgh 22, Pa. Plant operation will be continued at Bellefonte, Pa., where the firm manufactures straighteners and other specialized machinery for steel and nonferrous metals industries. A section of the Pittsburgh office was opened last year when extrusion presses and other hydraulic machines were added to the line.

Greer Hydraulics Inc., Jamaica, N. Y., maker of aviation and industrial test equipment and hydraulic components, has new and larger offices at 6736 Lankershim Blvd., North Hollywood, Calif. E. O. Gibson Jr. is operations manager. Test equipment spare parts and accessories are warehoused.

American Wheelabrator & Equipment Corp., Mishawaka, Ind., moved its Detroit district sales office to 13504 Fenkell Ave. The firm makes blast cleaning equipment, steel shot and steel grit blast cleaning and peening abrasives, chemical and metallurgical dust and fume collectors, and other supplies for foundries and metalworking concerns.

Call Rotary

FOR FINISHED STAINLESS STEEL BARS

IMMEDIATE SHIPMENT FROM WAREHOUSE STOCK

To give you ever higher quality and faster delivery, Rotary is continually adding to its facilities for producing finished bar stock.

This new batch-type roller hearth annealing furnace has just been put into operation. The uniform heat treatment possible with this furnace enables us to obtain maximum corrosion-resistant properties and to "taylor make" straight chrome heat treatable grades to your requirements.

Rotary now has a standing inventory of bar stock and can supply rounds from ¼" through 4¼" and hexes from ½" through 2" at once. Bar flats on application.

STAINLESS BILLETS FOR FORGING IN COMPLETE SIZE RANGES

Rotary Electric Steel Co.

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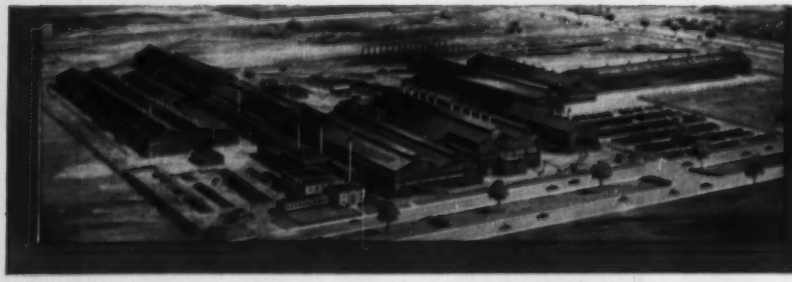


ALLOY and STAINLESS STEELS

BILLETS • SLABS
HOT ROLLED and
COLD FINISHED BARS

SALES OFFICES—Chicago • Cleveland • Newark, N. J. • Hartford, Conn.

SALES AGENTS—Indianapolis • Fayetteville, N. Y. • Houston, Texas

Technical Outlook

POWDER PARTS PRECISION—Ford Motor Co.'s steering gear and machining plant at Dearborn, Mich., is doubling its output of oil pump gears with a new metal powder compacting press. There's a gain in precision, too: Eccentricity between ID and OD is held to 0.0025 in., length to 0.001 in. Weight tolerance is within a gram. The press is a Model "L," 50-ton unit built by Baldwin-Lima-Hamilton.

TIRES FOR HEAT—Tires made of silicone rubber with glass fiber plies have been developed by U. S. Rubber Co. for possible jet aircraft use. They can withstand temperatures from −90 to 500°F. Temperatures in high-speed aircraft tire wells may go that high, ruining ordinary rubber.

THUMB-SIZE MOTOR—General Electric has an aircraft instrument motor weighing 1.2 oz, ⅝-in. in diameter and 1.2-in. long. It's a 2-phase design rated at 26 v and boasts a no-load speed of 21,000 rpm.

IMPACT TEST—A new instrument for measuring what impact does to metals and plastics has been developed at New York University. It measures impact in terms of dynamic stress-strain relationships. Stress-strain results have been mixed with the effects of waves propagated by sudden shock. In this new instrument (called the impact tube), the two elements are separated.

ANOTHER TESTER—An improved torsion testing machine has been designed by Pitman-Dunn Laboratories to fulfill requirements of the Army Ordnance Corps. The previous machine showed only a single value of torsional resistance and sometimes caused brittle fracture or deformation in metals of high or low hardness. The new tester produces shear fractures, records energy and torque values and shows how the applied torques and the specimen's resistance fluctuate during testing.

ARMED FORCES STANDARDIZATION—In 1944 a medium tank had 4310 spare parts. A single engine now powers six different tanks with 1320 spares. One headlamp assembly is used instead of six. Eight greases are replaced by a multipurpose one that'll do the job at from −65 to 125° F.

ATOMIC LUBRICANT—Look for different lubricants to take over the job on moving parts in the water-cooled nuclear section of atomic power plants. Oils and greases react chemically under irradiation. Lubricant deposits on fuel elements impede heat transfer. Research is aimed at bearing materials that will work with reactor cooling water as the lubricant.

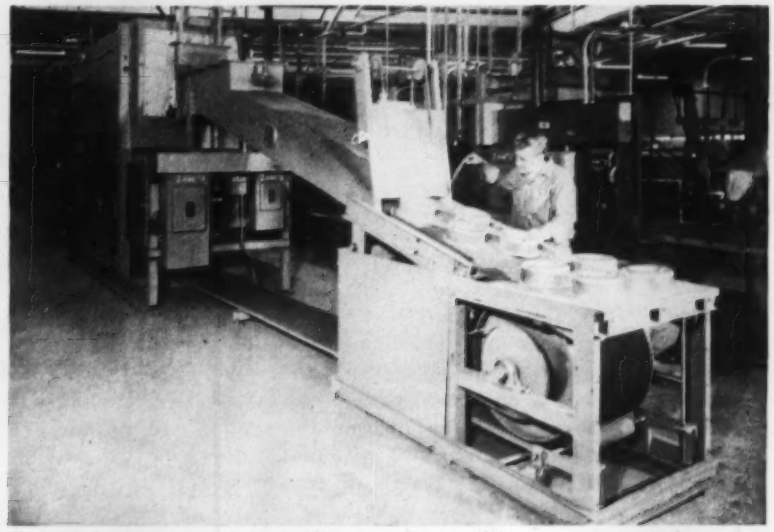
SAVE YOUR BOTTLECAPS—The automobile industry does, by the thousands. It found that paper milk bottlecaps are just the thing to seal off exhaust pipes and valve openings during painting.

RADIATION HAZARDS—The AEC has approved proposed standards to protect personnel and the public against radiation. Covered are persons who receive, possess, use or transfer source material, special nuclear material or by-product material under a license. The regulation will be published in the *Federal Register*, allowing 30 days for interested persons to submit suggestions.

No. 17 in STEEL's Modern Heat Treating Series

Heat Treating Stainless Steels I

By W. E. McFee
Armco Steel Corp.
Middletown, O.



This GE furnace is used for bright annealing and heat treating stainless steels at Salkover Metal Processing Inc., Franklin Park, Ill.

STAINLESS steels come in a wide range of types. Each has its unique advantages. Heat treating helps condition them for many different uses. Often, it's needed to expedite fabrication or to get maximum properties in the finished product.

Annealing gives stainless softness and ductility by removing cold working stresses. It dissolves chromium carbides precipitated during hot working or welding to guarantee full corrosion resistance.

The martensitic chromium types are given high hardness by quenching. They respond to heat treatment much like carbon and low alloy steels. Parts made from precipitation hardening alloys gain high strength and hardness after heating. Ways of treating both will be given in Part II next week.

Annealing—Hardness after annealing depends on temperature and time used. Temperature ranges for chromium-nickel types are given in Table I.

A good rule to follow: Use the low side of the range when carbon is low; the high side when carbon is high. The higher side gives slightly lower hardness in the same annealing time.

How Fast—Soaking time need not be long. Material is fully softened and carbides brought into solution rapidly after reaching temperature. A minute or two at annealing temperature suffices for light gage material.

Here's a practical rule to follow: Soak parts at temperature 3 minutes for every 1/10-in. of thickness. Heavy sections may require 45 minutes or longer.

Prolonged heating in the upper temperature range causes some

WHAT TO DO ABOUT STAINLESS HEAT TREATING TROUBLES

PROBLEM	CAUSE	REMEDY
Intergranular corrosion of chromium-nickel stainless types. Rough sandy surface when pickled	1. Carburization. 2. Zinc penetration. 3. Too low annealing temperature. 4. Too slow quenching	Be sure annealing temperature is high enough. Quench parts rapidly. Do not cool slowly through the range 1650 to 800° F
Coarse grains and brittleness in types 430, 442, 446	Overheating	Air cooling from 1800° F and above (as in forging and welding), followed by annealing will improve toughness but does not reduce grain size
Too low impact strength in types 410, 403, 414 and 431 in: A. Stress-relieved condition. B. Tempered condition	A. Hardening temperature too low and/or stress-relieving temperature too high. B. Hardening temperature too high and/or tempering temperature too low	A. Use high side of hardening range. Do not stress relieve over 750° F. B. Use low side of hardening range. Tempering under 1000° F is not recommended
Low tensile elastic properties in tempered condition in types 410, 403, 414 and 431	Excessive cold working, such as may occur in straightening of heat-treated parts	Stress relieve at 100° F below tempering temperature for 1 to 2 hr to restore elastic properties

grain growth. Shorter time at high temperature usually leaves a more easily pickled scale than a longer time at lower temperature.

Fast — Chromium-nickel types are cooled rapidly from annealing temperature. It keeps the carbides in solution. Water quenching generally is safest. Where distortion is likely, an air or steam quench is best.

Nonstabilized material with up to 0.08 per cent carbon is safely air quenched in sizes to 0.250-in. Air quench can be used for sheets up to 0.078-in. thick with as much as 0.10 per cent carbon. Beyond these limits a water quench is preferred.

Type 310 must be water quenched to minimize precipitation of grain boundary carbides. Large parts or heavy loads must be quenched as fast as possible after removal from furnace.

Go Into Solution—Annealing dissolves chromium carbides precipitated during hot working or welding—or when material has been exposed to temperature in the precipitation range or slowly cooled through it.

These carbides—found at the grain boundaries—are redissolved by heating above the precipitation range (800 to 1600°F), then cooling rapidly.

Types 304L and 316L resist carbide precipitation for short exposures in the sensitizing range. They are well suited for parts to be welded.

But they are not recommended for service that involves long exposure in the 800 to 1650° F range and where corrosive conditions are severe. Stabilized types 321 and 347 should be used.

Same Way — Stabilized grades are annealed the same as unstabilized austenitic stainless. They are protected against harmful precipitation of grain boundary carbides in the lower temperature ranges. Annealing in the upper range gives maximum ductility for severe cold forming.

A "stabilizing anneal" is sometimes used with Types 321 and 347. Annealed or welded material is heated to 1600 to 1650°F for 2 to 4 hr, followed by air cooling or water quenching.

Carbides are completely precipitated as stable titanium or columbium (niobium) carbides. Corrosion resistance is improved especially in the 800-1650°F service range.

Ferritic-Chromium Types—Heat treatment of these usually is confined to annealing, generally between cold working and deep drawing. Table 2 gives annealing procedure.

Soaking time requires only that the work be heated uniformly throughout—it may vary from 2 to 3 minutes for light gage sheet or strip to 1 hr or longer for heavy sections. General rule: Allow 3 minutes for every 1/10-in. thickness.

Copies of this article and Part II, on hardening stainless steels, which will appear next week, are available in quantities of from one to three until the supply is exhausted. Write Editorial Department, STEEL, Penton Bldg., Cleveland 13, O.

Light sections should be air cooled; heavier sections either air or water cooled. Cooling rapidly from annealing temperature helps impact properties. Retarded cooling of the ferritic-chromium types in the 750 to 1050°F range should be avoided.

Scaling — Though resistant to corrosion and heat, stainless steels will scale slightly at high temperature in normal atmospheres. Oxidation starts at about 450 to 550°F.

Degree of scaling depends on furnace atmosphere, temperature, time and alloy content. The higher chromium alloys are least affected. Control is important because stainless scale is difficult to remove by pickling.

Watch This—Carburizing conditions sometimes found in reducing atmospheres, or when parts are packed in material containing carbon, should be avoided. Reason: The carbon content of the stainless will increase. This means corrosion resistance goes down.

Furnaces—Design of gas and oil fired furnaces should not allow

PROBLEM	CAUSE	REMEDY
Network of fine cracks on surface of hardened parts after pickling and/or grinding (high carbon grades)	Strain cracks from pickling fully hardened parts or from overheating in grinding	The high carbon grades should not be cleaned by pickling in the hardened condition. They should first be stress relieved. Improper grinding is another cause of cracking
Discoloration of parts when passivated	Incorrect passivation procedure	Use of sodium dichromate in passivating baths will prevent clouding or etching of highly polished stainless steels
Scale difficult to remove by pickling	Reducing gases in furnace atmosphere	See remedy for pitting of pickled parts. Check pickling procedures for best methods of scale treatment
Low or nonuniform hardness	1. Hardening temperature too low or not uniform. 2. Decarburization may be giving thin soft skin	Make sure you are using proper temperature and time. Check thermocouples. Be sure hardness testing procedure is correct. Grind off $\frac{1}{32}$-in. and recheck hardness. If O.K., parts are probably being overheated, exposed to open flame or held too long at temperature

Table I—Annealing Temperatures For Chromium-Nickel Types

Type	Annealing Range
301	1900-2050° F
302	1900-2050° F
302B	1900-2050° F
303	1900-2050° F
304	1850-2050° F
304L	1850-2050° F
305	1850-2050° F
308	1850-2050° F
309	1900-2050° F
309S	1900-2050° F
310	1900-1950° F
310S	1900-1950° F
316	1900-2050° F
316L	1900-2025° F
317	1950-2050° F
321	1750-1950° F
347	1800-1950° F

TABLE II—Annealing Conditions for Ferritic-Chromium Types

Type	Annealing Range	Time*	Quench	Hardness Brinell	Hardness Rockwell
405	1200-1500° F	1 to 2 hr	Air or water	140-165	B77-85
430	1400-1525° F	1 to 2 hr	Air or water	140-165	B77-85
430F	1200-1450° F	1 to 2 hr	Air or water	165-190	B85-91
442	1400-1525° F	1 to 2 hr	Air or water	150-175	B80-88
446	1400-1525° F	1 to 2 hr	Air or water	160-185	B84-90

*For sheet and strip work, hold at temperature 3 minutes for every 0.100-in. of thickness.

work to be exposed to direct flame. This prevents carburization or decarburization.

Carburization is harmful to all types, as already pointed out. Decarburization causes loss of hardening power in the surface of hardenable chromium-stainless types. Austenitic chromium-nickel types usually are not adversely affected by decarburization.

Since fairly high temperatures are required to harden or anneal some grades, the furnace operation must be watched closely, especially when equipment is not designed for high temperature work.

Atmospheres—Any conventional gas or oil fired, electric or induction furnace is satisfactory—even the simple muffle type. Slightly oxidizing atmospheres are preferred because scale is easier to remove from them by pickling.

The controlled atmosphere furnace gives scale-free treatment. A gas-tight furnace and dried atmospheres of hydrogen or cracked ammonia are required.

Cooling—For bright annealing and hardening the furnace should have a cooling chamber separated from the heating chamber by a furnace door. Cooling chambers are water jacketed and fans promote rapid cooling of the charge.

When annealing chromium-nickel grades, a quick transition should be made from heating chamber to cooling chamber to get the right quenching effect.

There is a tendency for grain growth when soaking at a high temperature for a long time. Result is a coarse surface when the steel is drawn or formed.

Induction heating is fast. Example: A bar 1½-in. in diameter can be brought to 2100°F in 9 sec. Rapid heating reduces scaling. Other advantages: Close temperature control, elimination of starting up costs and down time and better working conditions.

Preparation—Metal should be cleaned thoroughly before heat treatment. It prevents local carburization and etching during subsequent pickling. Water-soluble lubricants come off with alkaline cleaner. Mineral lubricants are removed by a vapor degreaser or solvent cleaner.

Surface contamination by zinc or zinc alloys, such as is used in some types of dies, should be watched. Where there's exposure, clean parts in a nitric acid solution before heat treating.

WHAT TO DO ABOUT STAINLESS HEAT TREATING TROUBLES

PROBLEM	CAUSE	REMEDY
Cracking of hardened parts	1. Quenching is too drastic. 2. Poor design. 3. Fillets are too sharp at corners	Check to see that water has not accumulated in bottom of oil bath. Quench in oil warmed to 250° F or air cool. Don't let hardened parts lie around and become cold. Stress relieve them at once after cooling below 400° F
Distortion of hardened parts	1. Nonuniform heating. 2. Quenching is too drastic	Be sure parts are heated slowly and uniformly to hardening temperatures. Air cooling will give less distortion than oil quenching
Severe etching or corrosion of parts when pickled or passivated	Carburization of surface	Remove all carbonaceous material from parts before heating. Check salt baths for cyanides or other carburizing materials
Pitting of heat-treated parts when pickled	Reducing gases in furnace atmosphere	Be sure atmosphere is kept on the oxidizing side. Burners may be clogged and require cleaning
Hardness not uniform after tempering	1. Tempering temperatures not uniform. 2. Decarburization present on hardened material	See that loads are charged and spaced so parts are at the same temperature. Make sure material was uniformly hardened before tempering. Check thermocouples. (See previous remedy for low hardness after hardening.)

Beyond the Metals

PART II

By VAN CALDWELL
Associate Editor

Carborundum Co

Super refractory shapes

REMEMBER bouncing putty and the "how can you use it?" campaign that introduced that early silicone? A lot of the super refractories are in the same boat right now. They have great possibilities when industry finds out how to use them.

CARBIDES

No super refractory is better known or more widely used than silicon carbide. It's an old timer with great growth potential. The properties that make it important are relative low cost among super refractories, great hardness and abrasion resistance, a heat transfer rate up to 15 times that of fireclay, excellent resistance to cracking and spalling, and refractoriness that permits it to support heavy loads at temperatures above 3000°F.

It's an acid refractory, highly resistant to acid slags. This rules it out for basic slags and oxidizing conditions. Reducing atmospheres can be tough on it too.

Silicon carbide has an exceptional electrical property: High resistance at low temperatures shifting to low resistance at high temperatures. This makes it a natural for furnace resistance heating elements that can produce temperatures several hundred degrees above the wire-wound furnace ceiling.

Substitute—Of all refractories, none has found more ways to directly replace metals than silicon carbide. One long-established use is for skid rails in billet heating furnaces. One year after silicon carbide rails were installed in a pusher-type forge furnace, they showed 1/16 in. of wear. During that period, 16,000 tons of steel had been pushed over them.

An automobile maker is using silicon carbide for furnace brazing fixtures. They give twice the life of the previously used alloy fixtures and the brazing material doesn't stick to them. Best yet, they don't warp in the 2100°F heat.

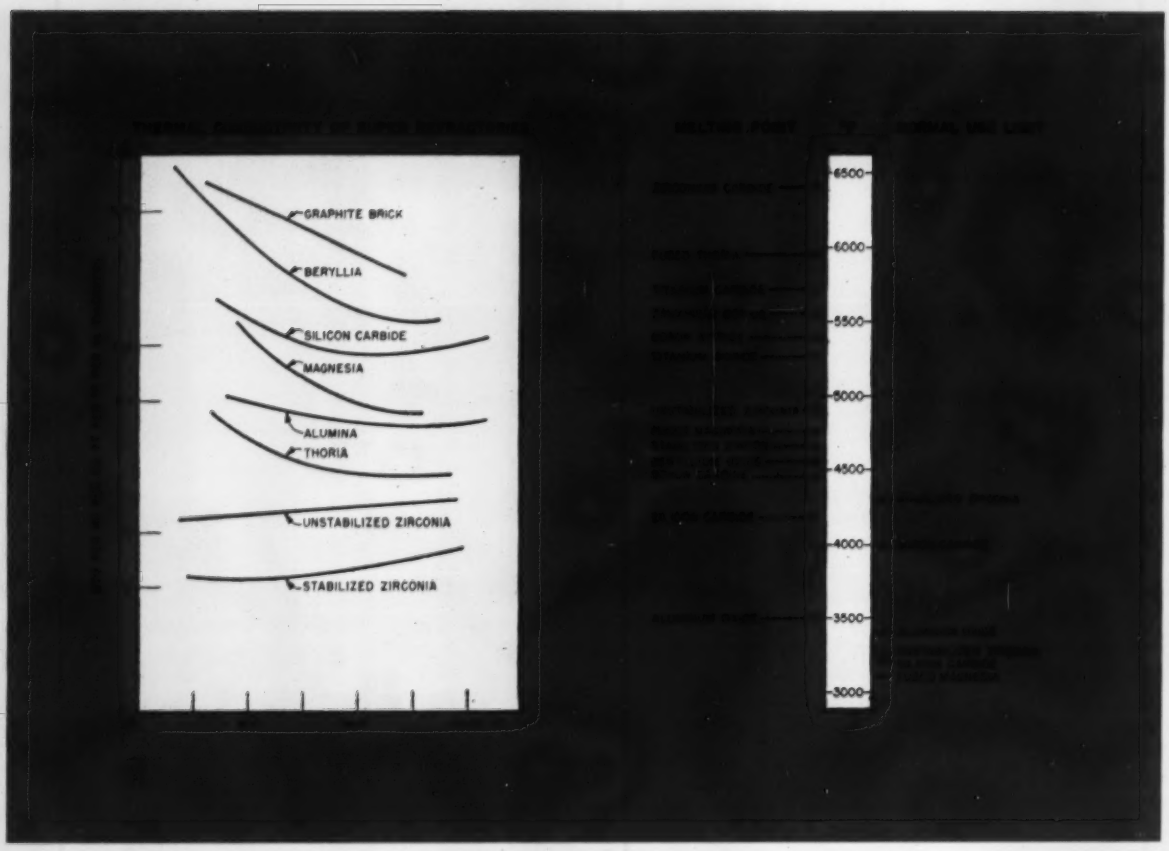
Gas Generator—During the war, silicon carbide cylinders were used to replace hard-to-get nickel alloy tubes in gas generators for heat treating furnaces. The application proved so successful that today the majority of such generators use the refractory tubes.

In steel mills, silicon carbide linings are solving wear problems in dust collectors and in elbows of hot blast mains and downcomers. Shock resistant lips for soaking pits have reduced damage caused by toppling ingots.

Guides and Rolls—In wire mills, silicon carbide wire guides and lips for plating tanks have solved a tough wear problem. Numerous roller-hearth furnaces use silicon carbide rollers that maintain full hearth loading at top operating temperatures. Steel won't stick to the rolls and the rolls don't warp.

An unusual use is for honeycomb sound absorbing walls in jet engine test cells at the Studebaker jet engine assembly plant; the walls take the full hot blast and shock wave of the jet.

New Angle—A recently intro-



duced silicon-nitride bonded silicon carbide gets around some of the limitations imposed by the silicious materials used to bond most silicon carbide products.

It shows exceptional dimensional stability, shock resistance and chemical inertness at 3000°F. Among objects being made from it are pumps that operate under a molten aluminum bath and threaded nuts, bolts and tubes. It has been used with good results for rocket throat shapes.

More Carbides—Three other carbides are on the edge of industrial importance as refractories: Titanium carbide, zirconium carbide and boron carbide. The same properties of great hardness, and of high-temperature resistance to softening, oxidation and thermal shock that make titanium carbide a superior component of cutting tool materials, give it great refractory promise.

Both it and zirconium carbide have been used with some success in turbine blades, bearings and nozzles. Zirconium carbide has the higher melting point (6380° F) and compressive strength, 238,000 psi. (Compare 5680°F and 100,000 psi for titanium carbide.)

Hardest—Boron carbide is the hardest man-made commercial material. Well-established metalworking uses are for lapping abrasive as a substitute for diamond dust, sandblast nozzles, gage rings and micrometer anvils, and as the cutting agent in ultrasonic machining.

It has a greasy feel like graphite. This quality makes it a good candidate for bearings and slides. It maintains its properties to above 4000°F in nonoxidizing atmospheres, but its use as a refractory is still largely experimental.

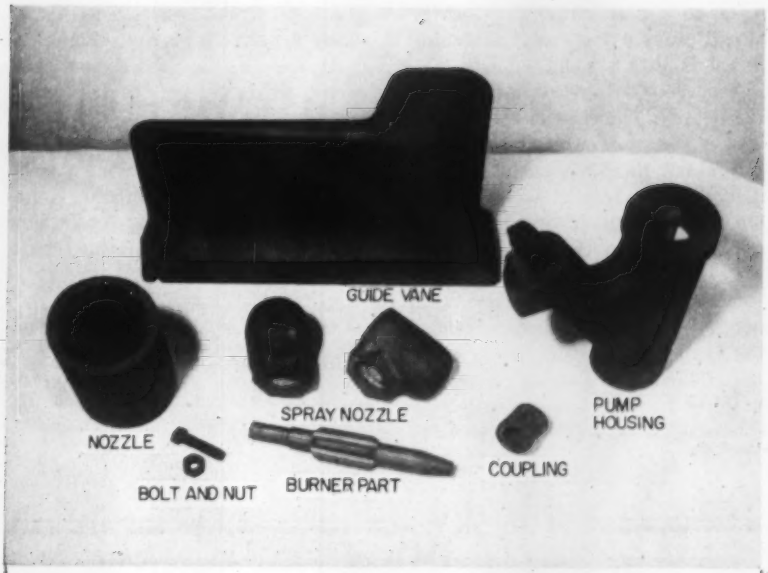
Neutron Grabber—However, it has found a home in the atomic energy field where ability to absorb neutrons makes it valuable as a control element in nuclear reactors. Tip-off to another future area of use—acids and alkalis don't faze it.

Two other carbides that will bear watching are those of tantalum and hafnium. Both have melting points above 7000°F. Hafnium carbide has been proposed as an industrial diamond substitute; it may have refractory possibilities as well.

BORIDES

The borides of chromium, titanium and zirconium are refractories for the future. They are available in experimental quantities and have been tried on a smattering of applications (nozzles for spraying molten metals, small crucibles, wire drawing dies, pump parts and orifices for die casting machines, impellers, valve parts for corrosive and abrasive agents, electrical contacts).

High melting points (some in the 5000°F area) and great hardness make them interesting. Although brittle at room temperature, they gain some ductility at high heat. Titanium and zirconium boride show rather poor oxidation resistance, but some chromium boride refractories resist oxida-



STRONG IN THE BOND

How imaginative bonding can enhance the worth of a super refractory is demonstrated by Refrax, a silicon-nitride-bonded silicon carbide introduced last year by the Carborundum Co., Perth Amboy, N. J. The combination material has these interesting properties:

- Great dimensional stability. No heat warpage
- Coefficient of expansion so close to that of zirconium boride that the two can be used to make composite assemblies
- Chemically inert to most acids, corrosive slags, molten mica and molten aluminum
- Low sensitivity to heat shock
- Complex parts with thin sections can be accurately molded
- Smooth close-grained surface texture
- More resistant to abrasion than other silicon carbide products
- Weight roughly that of aluminum

tion well up to the 1800°F level.

Powder Forming — Refractory shapes are formed from borides by powder metallurgy techniques. A good deal of work has been done with them as components of cermets.

Zirconium boride shows excellent resistance to molten aluminum, copper, tin, magnesium and fluorides. It fails in contact with molten iron.

Intimate mixtures of borides and carbides (Ti B_2 and B_4C; ZrB_2 and B_4C) seem to combine many of the good features of both, showing compressive strength of 600,000 psi and bending strength of 55,000 psi at 2200°F. They are being tried for turbojet parts and jet engine flameholders.

NITRIDES

The nitrides of boron and silicon are beginning to be of refractory consequence. Boron nitride appears to be unsurpassed as a crucible and mold wash for glass, and has similar uses with metals. Its price (in the neighborhood of $50 a pound) could drop considerably if uses justified commercial scale production.

It has one standard application as a constituent of Ignitron ignitor tips, and makes an effective thermal insulator for vacuum furnaces because it is not heated by high-frequency induction. It ought to make a good wash for forging dies, and has other possibilities as a high-temperature lubricant.

Silicon nitride has been used for thermocouple protection tubes at temperatures to 2500°F. It resists attack by nonferrous metals, and most acids and fluorides. The nitrides are chemically stable at elevated temperatures when not heated in air, making them good possibilities for vacuum furnace use.

INTERMETALLICS

Besides the cermets, another area claimed jointly by metallurgists and ceramists are the intermetallics: Nickel aluminide is one you will hear more about. Its resistance to impact (ductility) at 2000°F puts it out in front of most of the other super refractories for use in highly stressed parts. At this temperature it also shows excellent oxidation resistance.

COATINGS

So far we've been discussing refractories useful primarily as bonded or fusion-cast shapes, and loose grain. A field of refractory coatings beyond the porcelain enamels is also growing up.

A boron nitride coating has been applied to shapes of another refractory used as supports in automatic welding machines. It acts primarily as an anti-sticking agent.

Graphite coated with silicon carbide produces an interesting material being used for Nike rocket nozzles. There is a promising future for it in furnace parts: Muffles, hearth plates, liners.

Oxide Layer—One of the newest is an aluminum oxide coating for metals and other materials that combines the strength of the base with the refractoriness and chemical stability of the oxide. It is getting a tryout on reaction engine parts and ought to have a lot of down-to-earth uses as well. It has been successfully applied in thickness of 0.005 in. to 0.10 in. to a wide variety of metals and ceramics.

Zirconium oxide coatings are also in the works. One way these coatings can be applied is by a flame spraying process akin to

metallizing. Another is by vapor plating.

Silicide — No high temperature coating seems to be mentioned more often than molybdenum disilicide. It keeps molybdenum from breaking down catastrophically by oxidation at high heat. There's no better demonstration of the way that refractories and metals can team together to lick high temperatures.

But design engineers who have worked with metals all their lives find it hard to adapt their thinking to these newer materials. Brittleness, especially, makes them difficult to design around. Conventional supporting and fastening methods aren't good enough.

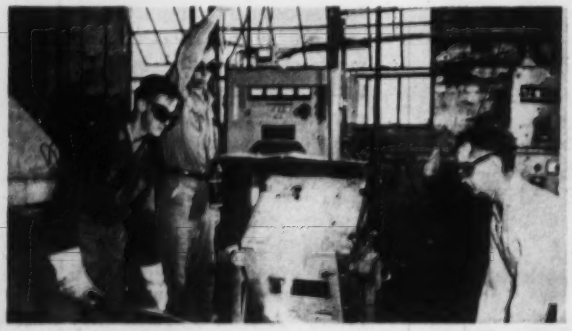
Ahead — Wherever metals and refractories meet there's still a vast amount of work to be done in making them compatible chemically, in reconciling widely different coefficients of expansion, in bonding one to the other.

Cermets, intermetallics, refractory mixtures and advances in bonding techniques have extended the super refractory range but aren't the whole answer. Virtually nothing has been done with prestressing to take advantage of the great compressive strength of many super refractories. Some refractories can be brazed, but they aren't weldable, yet, in the usual sense.

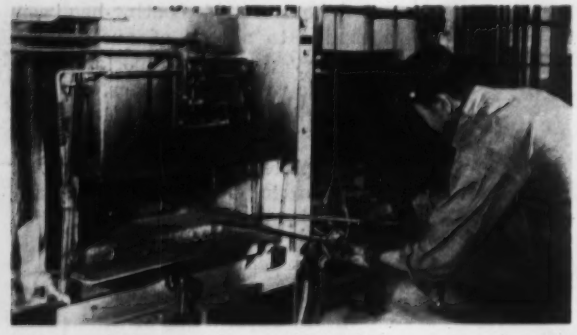
But though there is much to be learned, wide metalworking use of super refractories is sure to come. In what they are doing today, you can see the outlines of the future beyond the metals.

Extra copies of this article, and Part I on the general properties of super refractories and the oxide members of the group, which appeared last week, are available in quantities from one to three until the supply is exhausted. Write Editorial Department, STEEL, Penton Building, Cleveland 13, Ohio.

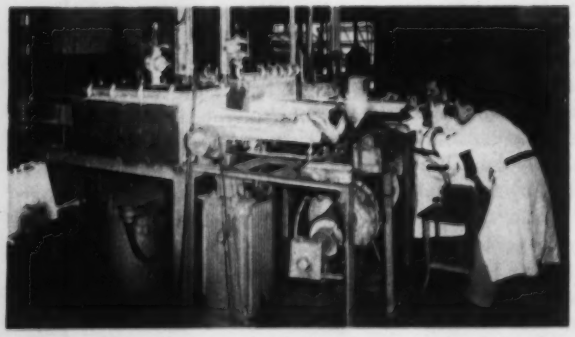
BREAD AND BUTTER



Magnesium oxide grain for induction furnace insulation

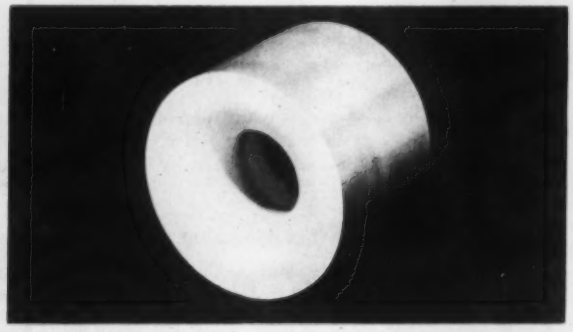


Silicon carbide hearth plates for high-temperature furnaces

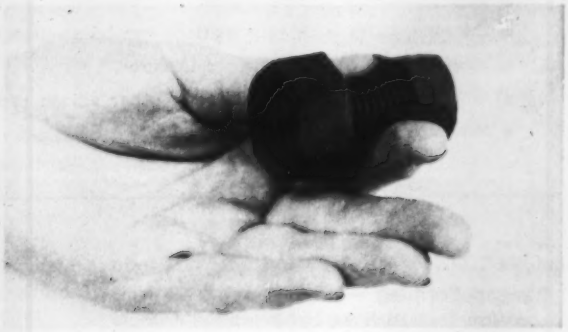


Pure alumina refractories for hydrogen atmosphere furnaces

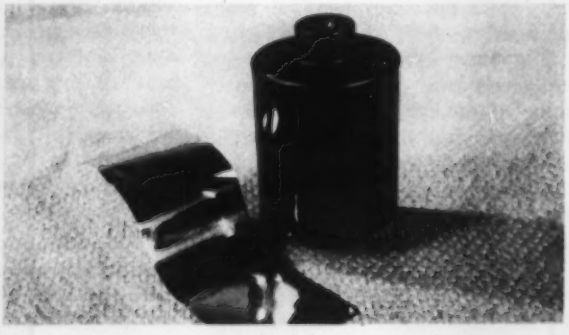
BLUE SKY



Aluminum oxide coatings to protect metal parts from heat

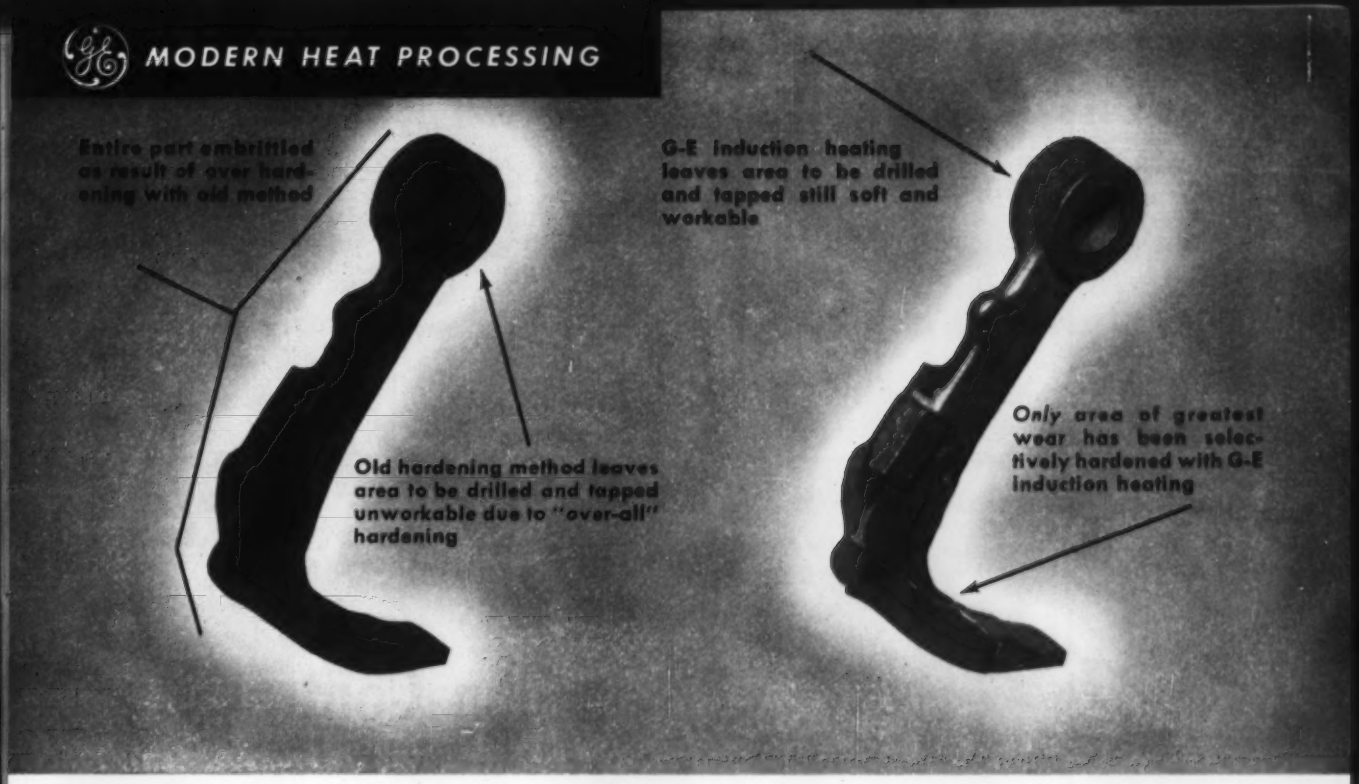


Improved silicon carbides for strength and close tolerances



Boron carbide rolls for working precious metals

MODERN HEAT PROCESSING


Entire part embrittled as result of over hardening with old method
Old hardening method leaves area to be drilled and tapped unworkable due to "over-all" hardening
G-E induction heating leaves area to be drilled and tapped still soft and workable
Only area of greatest wear has been selectively hardened with G-E induction heating

PROBLEM:

Chill-cast rejects at Draper Corporation due to (1) Embrittlement (2) Over-all hardening

SOLUTION:

G-E Induction Heater Cuts Rejects 95% By Pinpoint Hardening Cast-iron Parts

The East Spartanburg, S. C. division of Draper Corporation was having difficulty controlling the hardening of cast-iron parts. Their old chill-cast hardening method forced them to reject many of the parts, which were overhardened and brittle. In addition, they had no way of controlling the size of the area to be hardened. This made drilling and tapping operations difficult—and frequently impossible.

SINCE INSTALLING A 20-KW G-E induction heater in their production line, they are able to cast the parts, drill and tap them while the cast iron is still soft, and then selectively harden only the area of greatest wear. This "pinpoint" hardening reduces the heated area of the parts by 70-90%. As a result, rejects have been cut 95%, costs are reduced, and the Draper Corporation is producing a product of uniform high quality.

THE COMPLETE SATISFACTION of Draper Corporation with their General Electric induction heating equipment was expressed by Mr. Fred Burgess, Plant Engineer: "Our G-E induction heater has been in operation for over five years. During that time we have greatly reduced manufacturing costs because of our decreased scrap losses and increased production. Maintenance of the heater hasn't been any problem, either. We just couldn't ask for any better service than we've had from our G-E equipment."

GENERAL ELECTRIC

WATCH FOR ANNOUNCEMENT

of General Electric's complete NEW line of electronic induction heaters

---

For application assistance, contact your nearest G-E Apparatus Sales Office or send coupon for free bulletin GEA-4945.

General Electric Company
Apparatus Sales Division, Section A722-2
Schenectady 5, New York

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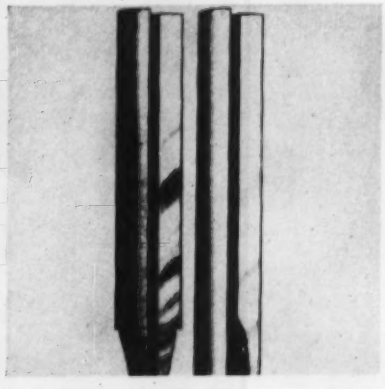
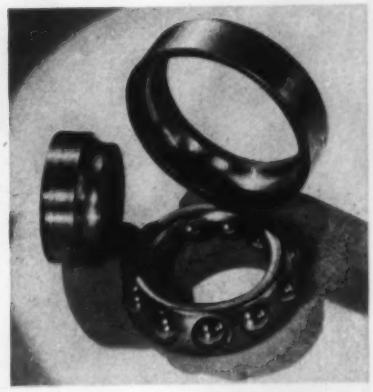
Position .....

Company .....

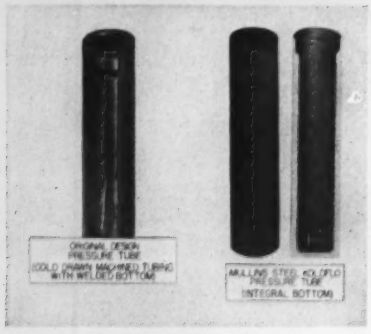
City ..... State .....



"Well drilling . . . requires a steel that is completely dependable, uniform."



"Cleanliness is the most significant requirement for bearing life. . ."



"It still sounds impossible . . . bar stock performs well in this application."

Production Control of Quality Steels

By R. W. Graham
General Superintendent
Duquesne Works
U. S. Steel Corp.

Users are pressing for ever-better quality in the steels they buy. A plant operator, responsible for costs and quality, sizes up the problem

THERE WAS A TIME when specifications read: "Steel for carriage tires;" "steel for plowshares;" "horseshoe steel;" and "blacksmith bar steel for forging." Today, we have requirements for special-purpose steels, too, but the names read: "Axle shaft quality;" "bearing quality;" "gun quality;" "aircraft quality;" and many others.

Basically, this trend in names reflects the transition from horse-and-buggy transportation and relatively simple manufacturing processes to present-day high-speed transportation and complex industrial operations. It indicates the more exacting requirements of present-day steels.

High Safety Factors—Then, as now, quality was measured by performance, but older designs were based upon safety factors of four or five or even higher and allowed for substantial quality variations. The exacting requirements for modern machines give us no such latitude.

In the automotive industry, competition and the desire to reduce weight have dictated designs requiring higher unit stresses while design factors have been reduced. In the aircraft industry, alloy steels are being heat treated for use at strength levels of over 200,000 psi. Design factors as low as 1.1 are being used.

No Margin—Engineers are making tremendous advances in machine design, and perhaps we in the steel-manufacturing business should feel gratified at the confidence they have in our products.

Modern designs leave no margin for error in the steel-making operations. Steel for these modern applications must conform in all respects to the expectations of the designer and in a completely uniform and dependable manner.

It was not so long ago that steel acceptance was based largely upon chemical, tension, bend or hardness tests and visual surface inspection. Progressively, specifications have been broadened to include additional factors. Many ingenious devices have been developed to examine external and internal characteristics of the product. Newer quality determinants include grain-size specifications and guaranteed hardenability.

Cleanliness Ratings — Machinability and specified impact properties are commonly written into specifications. Once used loosely, the term "dirty steel" is defined by numerical relationships called cleanliness ratings. Many products are accepted or rejected on them when machining or service requirements are influenced by nonmetallic inclusions.

After steels have passed the exacting tests specified, their final quality determination results from rejection levels in the plants of our customers and the perform-

ance of products in service.

A Tough One—One of the most difficult applications presents a seemingly impossible steel problem. Even after seeing the operation and realizing that the patient lived, it still is difficult to understand how or why. It starts with a short piece of carbon steel bar stock of AISI 1012 grade, weighing 17.75 lb.

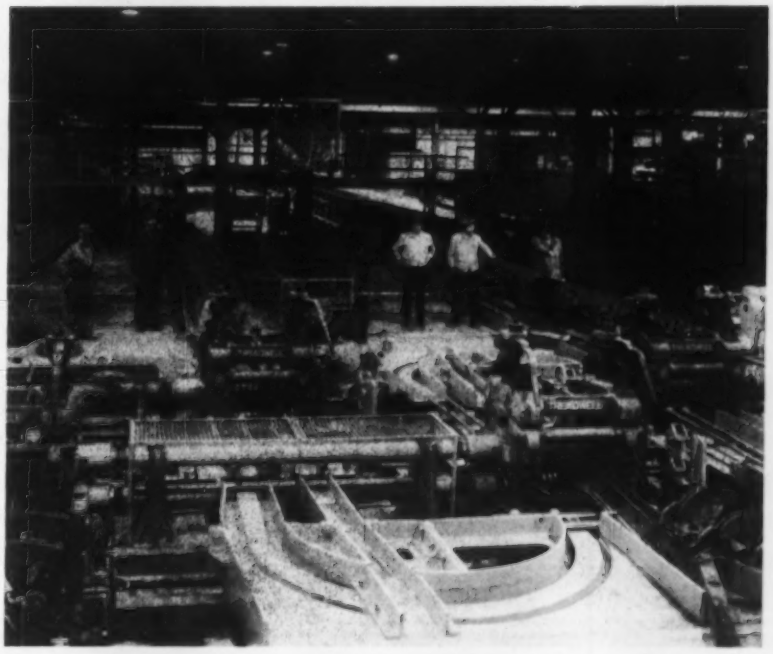
The specification sounds simple enough, but look what happens to it. In four press operations, it is cold-extruded at pressures reaching 100 tons per sq in. into a 15-in. torsion tube. It is about 4 in. in diameter, closed at one end and offset on the inside at the open end.

The finished part weighs 17.4 lb, requires no final heat treatment or machining and has a surface finish of under 50 microinches rms. Scrap loss is only 0.35 lb per unit. While the fabricator is faced with manifold problems in such an operation, we as steel producers must furnish a product that can withstand this most severe usage and still emerge from the presses completely free of external and internal defects—with a surface that can be used, as extruded, without machinework.

Alloy Application—The oil industry is faced with the problem of drilling deeper and deeper wells, many of them going as far as 18,000 ft or deeper. The obvious problem is handling extremely long strings of drill pipe and drill collars. It is complicated by the extremely hard formations in some deeper wells and temperatures as high as 600°F at extreme depths.

We supply substantial tonnages of alloy bar stock, 6 to 8½-in. in diameter and 30 to 35 ft long, for fabrication into drill collars. The steel must be uniform in chemistry and relatively clean. Bars must be straight to permit drilling or trepanning through the entire length and must be readily machinable (even though they are heat treated to a hardness in excess of 270 Brinell) and be able to meet a minimum impact requirement of 30 ft-lb.

Obviously, a steel that is completely dependable and uniform is required. When a driller puts his string down 18,000 ft, he must be sure that steel failure will not leave him with a difficult fishing job or even an abandoned well.



Unique Repeater Switches Bar Mill Products

Five intermediate and leader stands of Phoenix Mfg. Co.'s new merchant bar mill at Joliet, Ill., are all equipped with Birdsboro repeaters of a new design. Designed for double stranding rounds as in wire mills, the units remain on location but can be moved laterally in switch-like fashion for by-passing during a reversing operation. They are the first of their kind

Bearing Steels—These important grades can be classified into two main groupings — the through-hardening and the carburizing grades. Cleanliness is the most significant requirement because of its great importance to bearing life. Excessive inclusions are focal points for spalling or fatigue failure.

Nonmetallic inclusions are for the most part the products of deoxidation. Precise control of their nature and frequency is essential in the melting of bearing steels. Heats are accepted or rejected on the basis of microscopic examination of representative samples. Cleanliness ratings are reduced to numerical values—usually by the ASTM method which utilizes the Jernkontoret Chart as the comparison standard.

The Toughest—It is probable that the production of steels to aircraft specifications presents the most exacting of all tests for quality control programs and for melt-shop techniques. Magnaflux indications more than 1/16-in. long are considered cause for rejection, particularly if they are in critically stressed areas.

Obviously, this product requires the best quality that can be obtained in the electric furnace—and it is product of this type that is most likely to create a demand for improved facilities and practices in the future.

The exacting and difficult requirements outlined emphasize the problem of co-ordinating quality factors in the complex operation of a modern steel plant. Basically, quality control consists of establishing proper and adequate practices and following them to the most minute detail.

Strict adherence must apply not only in melt shops but throughout all operations—from the procurement of raw material to the shipment of finished product. It even applies beyond final shipment, since it is necessary to correlate performance of the end product with the practice established in the shop.

(Next week: How to control chemistry.)

Which chain problem is yours?

Your Republic Chain Distributor can come up with the answer...

Is your problem one of corrosion-resistance, such as that solved by the Republic Chain application illustrated at right? Or is hoisting, hauling, holding, towing, bundling? Or is it a selection of chain for use with the product you make?

In any case, you'll want to be sure of your chainmaker. Republic backs its chain distributors with these vital services:

COMPLETE LINE—Your Republic Chain Distributor offers a complete line of every type and size of welded and weldless chain, chain slings, attachments and accessories in all standard and special carbon, alloy and stainless steel analyses.

DEPENDABLE DELIVERY AND SERVICE—His own stocks of chain are backed by Republic Round Chain plants and warehouses strategically located in principal cities from coast to coast. You get exactly the chain you need in a hurry, eliminating costly downtime and delays.

ENGINEERING—He has at his disposal the services of Republic's Field Engineering Department—staffed by competent chain engineers thoroughly trained to handle all types of chain problems.

QUALITY PRODUCTS—When you buy chain from your Republic Distributor, you're assured of a top-quality product in every sense of the word. Republic uses its own ores, makes its own steels, rolls its own bars, draws its own wire. In fact, Republic is the only chain producer who can control quality at every stage of production from raw material to finished product.

RESEARCH—Your Republic Chain Distributor offers you further assurance of top quality because he's backed by a research program devoted to the continuous task of improving chain. Republic research is always at work, from selection of materials through forming, welding, heat treating to the final inspection of the finished chain.

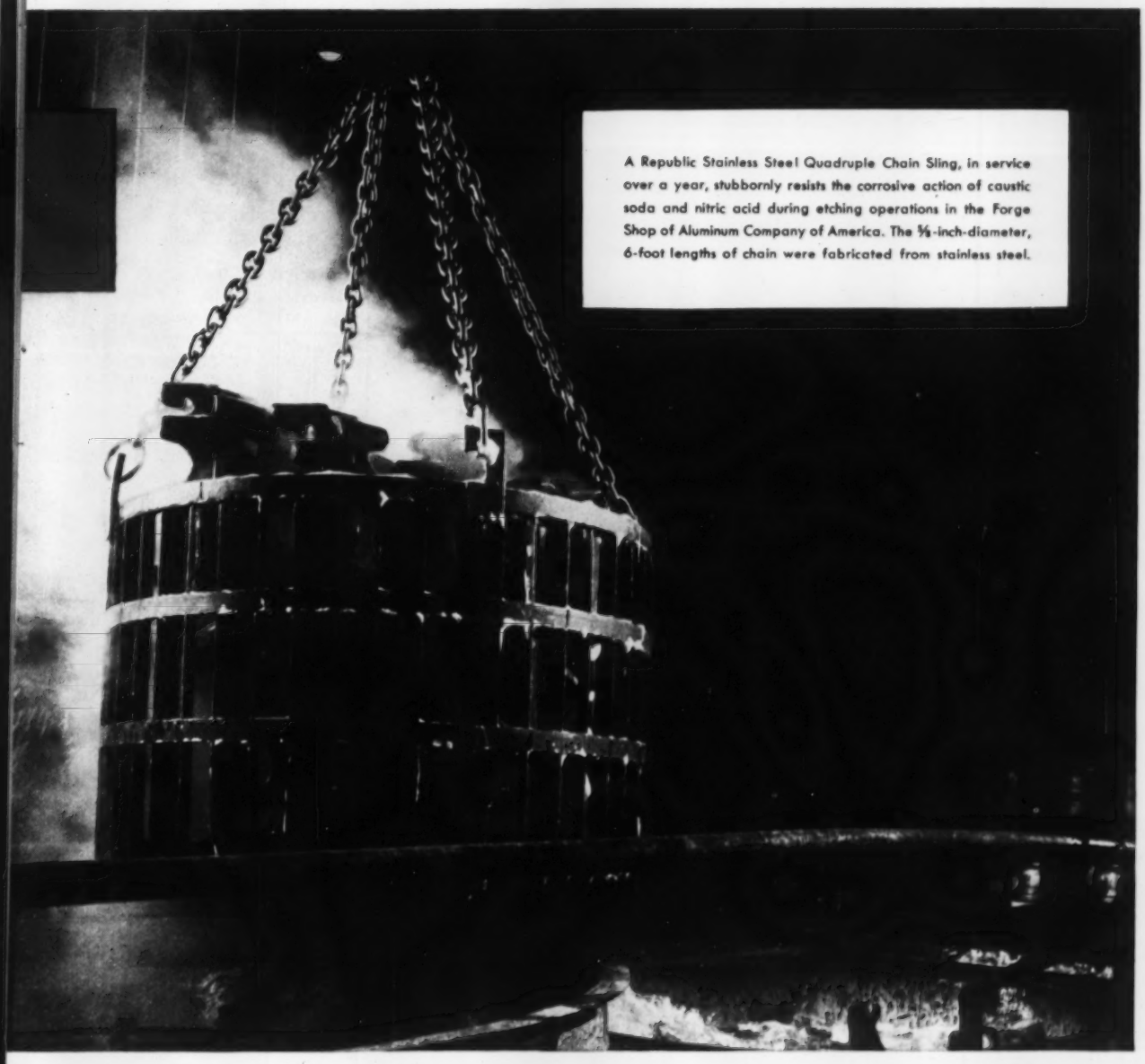
So, whether your chain problem is corrosion-resistance, materials handling or product applications—call your Republic Chain Distributor. He can come up with the answer. Mail the coupon for the name of your nearby Republic Chain Distributor.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

HERE'S THE ANSWER TO THE PROBLEM OF MORE SPACE—Truscon Steel Buildings. Whether you need a single building or a well-arranged group, Republic's Truscon Division can help you select the right layout to meet your requirements. You'll get a building that's fire resistant, well lighted, properly ventilated, easy to maintain. Truscon engineers will help you from beginning to completion.

PIPE PROBLEMS? Republic Steel Pipe may be the answer. It's been satisfying customers for over 40 years. Today, the Improved Continuous Butt Weld process makes it better than ever, yet it costs no more than ordinary pipe. Republic Steel Pipe has uniform strength and ductility. It is easily threaded, readily bent. Your Republic Pipe Distributor has it in sizes you want.



A Republic Stainless Steel Quadruple Chain Sling, in service over a year, stubbornly resists the corrosive action of caustic soda and nitric acid during etching operations in the Forge Shop of Aluminum Company of America. The ⅝-inch-diameter, 6-foot lengths of chain were fabricated from stainless steel.

FASTENER PROBLEM? You can get exactly the fasteners you need for assembly and maintenance work from more than 20,000 regular types and sizes made and stocked by Republic. They're always uniform, easy to assemble, tough and strong to withstand shock and vibration. Specify Republic Fasteners on your next order from your distributor.

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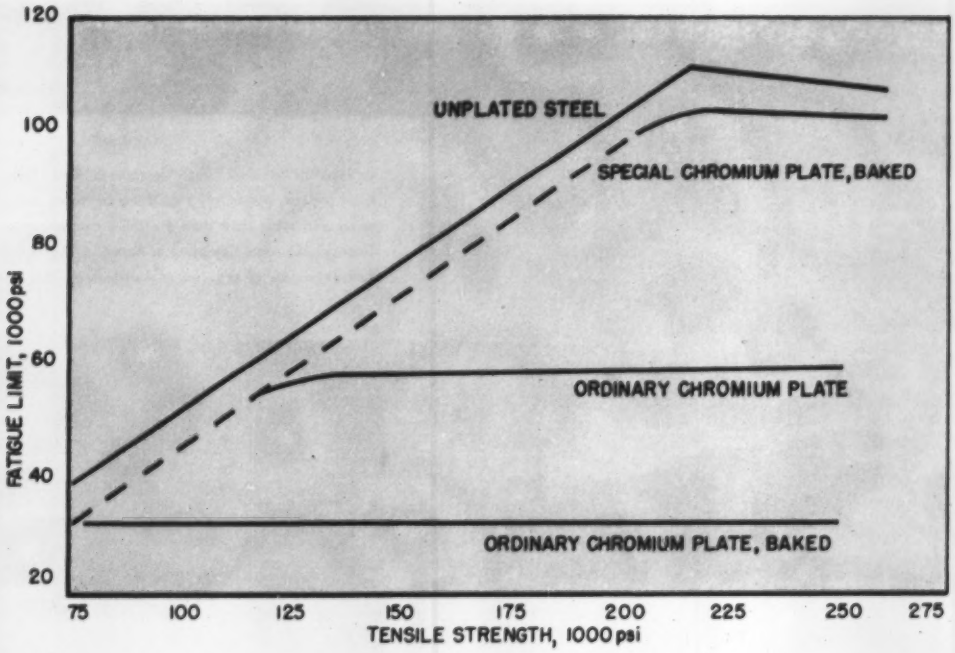


Tests with special plating bath on superstrength steel show . . .

How To Curb Chrome-Plate Fatigue

CHROMIUM PLATING causes more loss in the fatigue limit of high strength steels than it does in weaker ones. Some chromium deposits are more damaging than others.

Because of the importance of chromium plate in the service of today's stronger steels, United Chromium's research laboratories launched a study to pin down the properties of chrome plate that hurt the endurance limit of steel under repeated loading.

Discussing results before the recent convention of the American Electroplaters' Society in Cleveland, E. J. Seyb gave a number of pointers for curbing fatigue in the engineering use of chromium plating.

High Point—He also gave the composition of a chromium plating bath that reduces the fatigue limit of 266,000 psi, superstrength steel less than 2 per cent, after baking the plate. Ordinary chromium plate may knock it down as much as 50 to 60 per cent.

The special bath uses a high concentration of chromic acid (600 g/l CrO_3) and 4.8 g/l of sulphate. Plating is done at 130°F, with a current density of 3 amp/sq in. Plated parts are baked at 450°F for 4 hours.

Stress Factor — The investigation showed that stress in the chromium deposit is the primary factor in determining the fatigue limit. Low stress gives high fatigue strength, while high stress gives low fatigue strength.

The steel used for test specimens was SAE 4140. Tensile strength after heat treating was 211,000 psi for one lot, 222,500 for another. Hardness was Rc 43, and the fatigue limit was 109,000 psi for both lots.

Fig. 1 (page 83) shows a linear relationship between stress in the deposit and the fatigue strength of chromium-plated steel.

Another point: Stress and fatigue are related to the number of crack lines in unbaked chromium deposits. The number of crack lines is a measure of the stress in the plate—the more there are, the less stress in the deposit.

Minus Stress — Chromium deposits with negative stress give the highest fatigue results before baking.

For example, a deposit from United Chromium CR-110 bath containing 180 g/l of chromic acid plated at a current density of 1 amp/sq in. (110°F) showed a stress of minus 17,000 psi and 3500 cracks per inch. Its fatigue limit was 97,500 psi.

A fatigue limit of 57,400 was obtained under comparable conditions for an ordinary chromium deposit. It was plated from a standard bath containing 250 g/l of chromic acid at a current density of 2 amp/sq in. (130°F).

Heating Is Bad—Mr. Seyb reported that baking at 200 to 400°F to eliminate hydrogen embrittlement is harmful to the fatigue properties of the usual chromium plate.

His recommendation: Baking

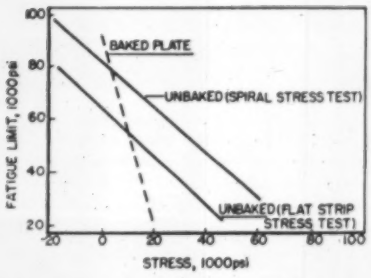


Fig. 1—United Chromium data show a linear relationship between stress in the deposit and fatigue strength of chromium-plated steel. Low stress gives high fatigue strength; high stress gives a low value

these deposits should either be avoided or done above 750°F. The use of higher strength steels does not necessarily improve the plated fatigue strength. Baking can be done at higher temperatures with softer steel, and, in this case, is more effective in restoring the fatigue strength of the plated and baked parts.

Help Here—Tests showed that chromium plated from the 600 g/l CrO_3 bath previously described stress relieves below 750°F to give high fatigue strength.

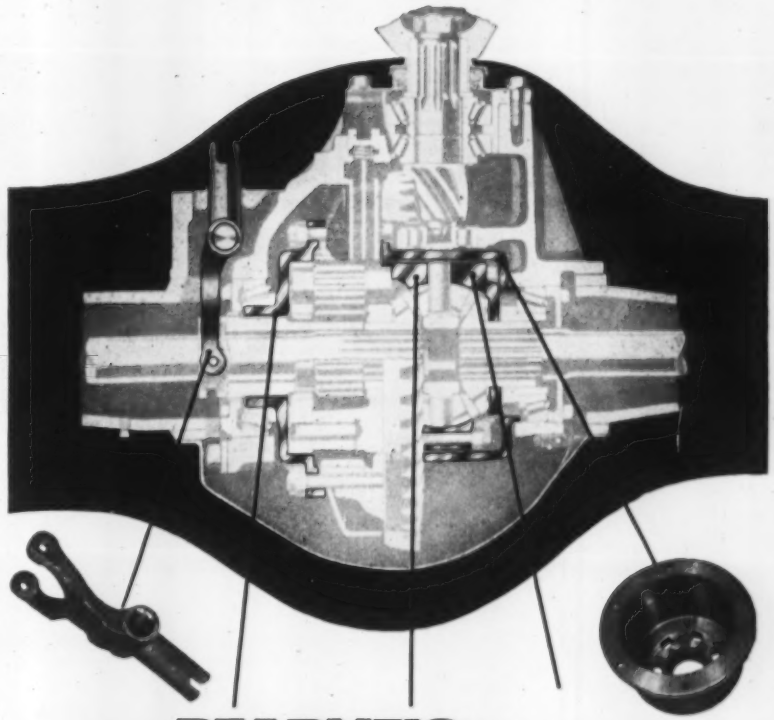
A deposit 0.010 in. thick gave a fatigue limit of 90,000 psi, after baking at 375°F; 104,000 psi, after baking at 550°F. This compares with 38,700 psi for ordinary chromium after baking at 350°F and 53,800 psi after baking at 750°F. The chromium plated from the special bath gave so much improvement on 222,500 psi tensile steel that further tests were made with harder steels.

More Proof—As before, 4140 was hardened, but it was annealed at 500°F to give a steel with tensile strength of 266,300 psi. Plated specimens were baked at 450°F for 4 hours. Both plated and unplated parts were tested at Wright Air Development Center.

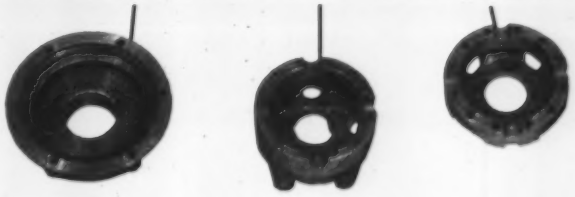
Results were good. The unplated steel gave a fatigue limit of 103,000 psi, while the plated and baked parts gave 101,000 psi—a reduction of less than 2 per cent.

This study by Dr. J. E. Stareck, E. J. Seyb and A. C. Tulmello was conducted for the Protective Coatings Division, Wright Air Development Center, Wright Patterson Air Force Base.

for **HEAVY DUTY** service



PEARLITIC MALLEABLE CASTINGS



The 2-speed truck axle is a *must* under varying load and road conditions because it provides a tailor-made ratio for every condition. But it takes a severe beating under heavy duty conditions encountered in logging, mining, farming, etc.

That's why Eaton Manufacturing Company, leading producer of 2-speed axles, specifies pearlitic malleable — from National — for several vital parts. For Eaton knows that pearlitic malleable has high ultimate strength . . . resists wear under heavy loads at high speeds . . . possesses excellent non-seizing properties. In addition, pearlitic malleable can be given a smooth finish . . . can be either liquid or air quenched. And perhaps *most important of all, pearlitic malleable machinability index ranges from 80 to 90* (B1112 steel = 100).

Look your product over critically. Pearlitic malleable castings—from National—can replace costlier fabrication methods . . . can offer opportunities of reduction in weight, machining and assembly time. AA-1157

Photos: Courtesy Eaton Manufacturing Company

NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY

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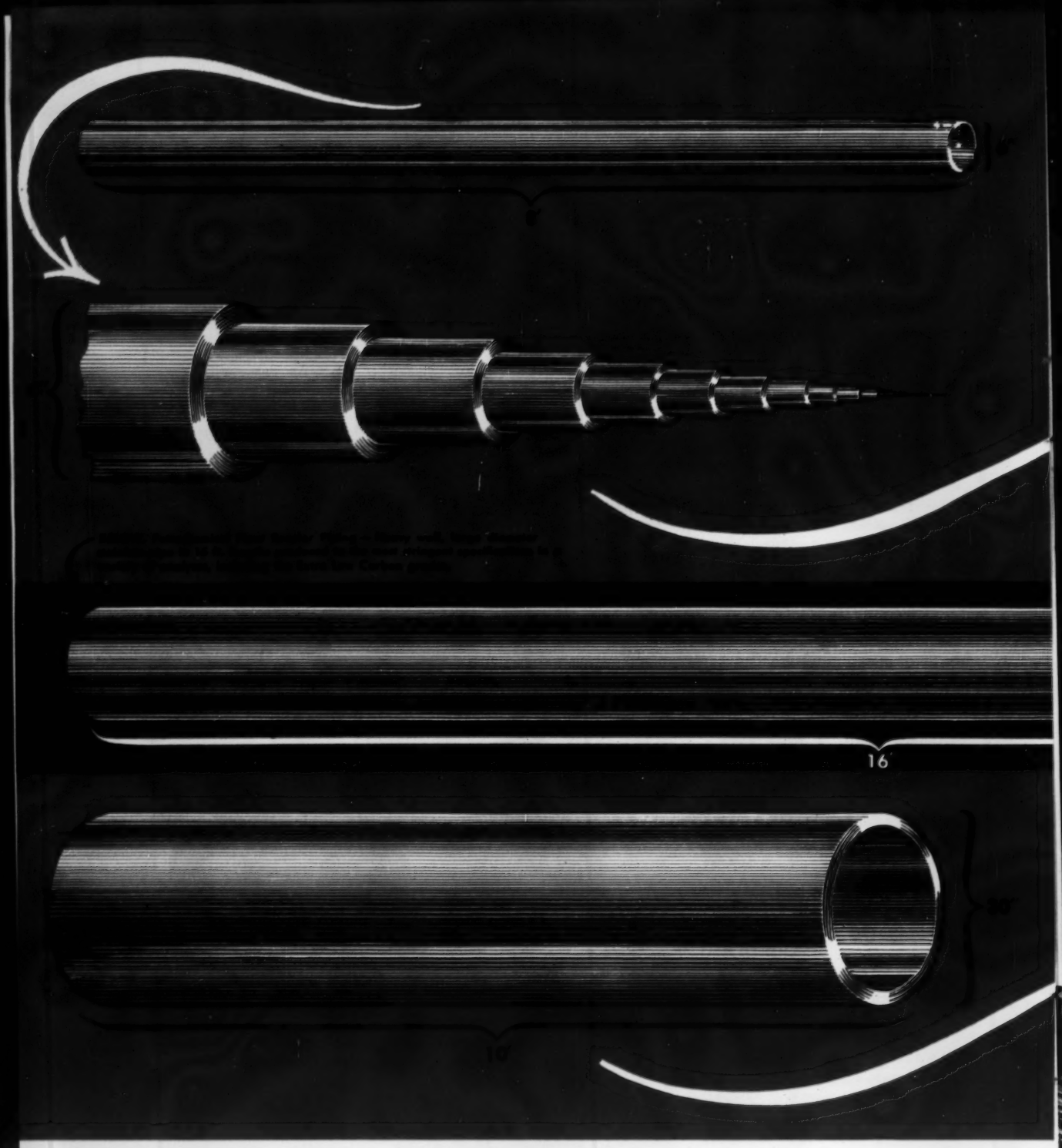
The Nation's largest independent producer of malleable and pearlitic malleable



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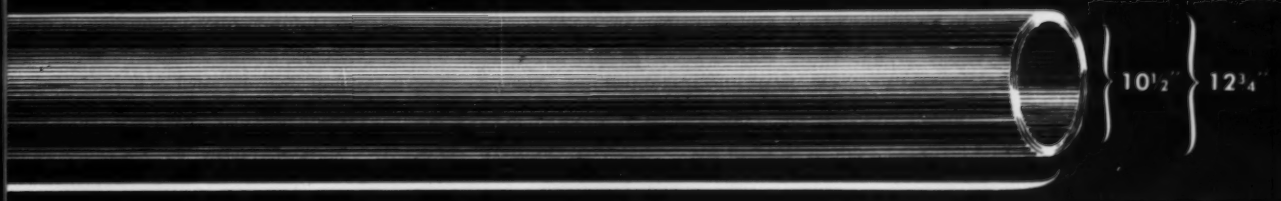
3 PROBLEMS
each different

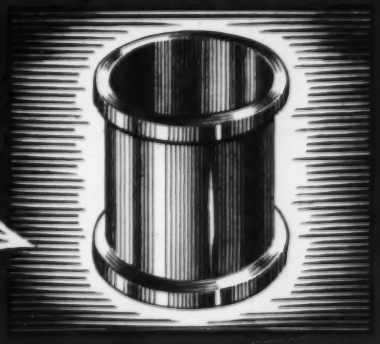
1 SOLUTION...

stainless steel
Centrifugal Castings

Heavy Wall stainless steel pipe, centrifuge bowls, hollow billets for finely drawn hypodermic needle tubing . . .

These are among the many end uses for metal mold centrifugally cast cylindrical shapes. They are typical of the exacting, difficult service conditions to which this product is subjected. All three examples shown demonstrate the fundamental versatility of this manufacturing process—unequaled product soundness—from hypodermic needle stock subjected to the repeated stresses of cold reduction, to the centrifuge bowl spun





at 1800 RPM, to the petrochemical plant reactor piping that must pass hydrostatic pressure tests equal to 90% of the Yield Strength of the metal. These are the proving grounds of quality—of the ability to meet even the most exacting of product specifications.

We welcome your inquiries. For descriptive literature on the versatile metal mold process, write to United States Pipe and Foundry Company, Special Products Division, Burlington, N. J.

Study these advantages for your cylindrically-shaped products

- Reduced processing time and increased production.
- Design of parts to suit the specific job requirements by selecting the correct alloy—not the next best available alternate.
- Conservation of expensive metals and alloys—especially on tubular parts now produced from solid sections.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—4" to 36"

Wall Thickness—⅜" and up

Length—Up to 16' in the "as-cast" condition

Types of Stainless Cast—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

THE SMART visitor at the Machine Tool Show won't be the one who is curious about only tricky concoctions.

He'll be the man that walks through the gate with his plant and products in mind — looking for lower costs per piece produced.

Jerome A. Raterman, president, Monarch Machine Tool Co. and second vice president, National Machine Tool Builders' Association, told STEEL that industrial executives will go home after the show, asking themselves what machine tools in their plant should be replaced.

Guides — Mr. Raterman suggests the answer to the replacement question is an arithmetical one. He says that both capital-recovery and the operating economies must be considered.

Here are some factors he lists as important to the replacement problem:

- A formula can be used to help solve the problem; it's also vital to use common sense.
- Savings in direct labor may be the most significant factor in the equation.
- Consider the benefits of better accuracy, inspection, etc.
- Check to see if a secondary operation can be reduced or eliminated.
- Compare maintenance costs of the machines.
- Consider that a new machine may eliminate a bottleneck, may speed up the flow of the product through the shop.
- Figure the advantage of using the new tax write-off allowances.

"Any company," Mr. Raterman goes on, "weighing replacement possibilities . . . should not only consider the advantages to be gained by replacement; it should estimate potential losses to be sustained by failure to replace."

The Machine Tool Show, Mr. Raterman says, offers the greatest opportunity that executives of metalworking companies have had for eight years (since the last show) to get the right answer to their replacement and modernization programs.

A F Precedent?

The American machine tool industry lost a skirmish with the Air Force when it recently purchased 45 radial drills and 21 shapers in Europe (STEEL, Aug. 1, p. 30).

This purchase is in contrast with the AF plan to fill the defense needs and to maintain a strong U. S. machine tool industry.

The purchase actually has little significance—unless it serves as a precedent. American builders would have loved to get the half million dollars worth of orders, but if this is the only purchase of its kind, the discussion no doubt will fade away.

Orders Climb

Machine tool orders for June totaled $77.75 million, according to the National Machine Tool Builders' Association. That puts the total for the first half of 1955 at $387.8 million. The figure for the same period last year was $286.95 million.

Housing Life Boosted

Modified machine puts axle housings through an automatic induction hardening cycle

HARDENING on a modified 200-kva induction heating machine increases the fatigue life of axle housings sixfold at Clark Equipment Co.'s axle division, Buchanan, Mich.

The part has substantially better wear resistance, is easier to grind and has a better surface finish.

Stresses—The axle housings are made of high carbon steel seamless or welded tubing. Critically stressed areas are the inner wheel bearing and fillet. While service with the unhardened housings had been satisfactory, Clark's engineers felt those stress points could be improved.

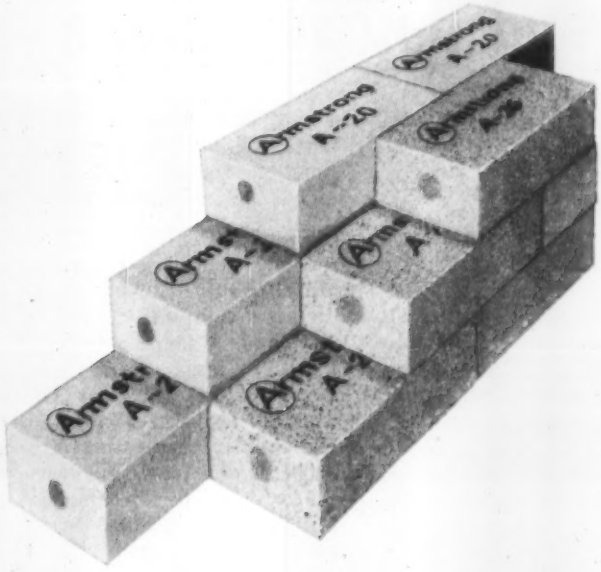
Experimental runs indicated that a standard induction hardening machine did not give uniform heating, and an undesirable amount of distortion took place. Rotation of the workpiece avoided these difficulties. The induction hardener was modified to permit workpiece rotation on a production basis. One of the two centers was redesigned to take a driving unit consisting of a motor and speed reducer. The driving center is mounted on a radial thrust bearing. The motion is transmitted to the second center through a shaft driven by a sprocket off the speed reducer.

Cycle—Operation of the modified machine is simple. A housing is lowered into position by an overhead hoist. The operator trips a button to activate the centers, which move into position to pick up and hold the housing and start it spinning. A second button starts the induction hardening cycle—an automatic sequence: A 0.45 minute heat at 1550 to 1600° F, 0.34-minute quench, 0.15-minute draw at 600° F and a 0.22-minute light quench to permit handling. About 130 housings are hardened an hour.

Induction hardened housings, under test, withstand more than a million stress cycles, compared with 200,000 cycles for unhardened housings.

Double Identity...

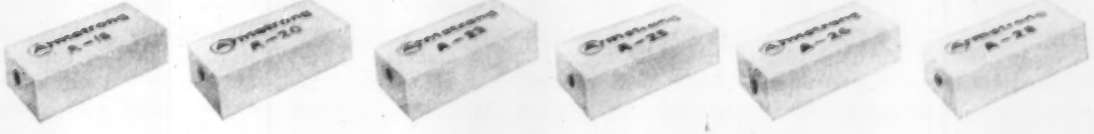
Armstrong Insulating Fire Brick are marked in two places to simplify handling



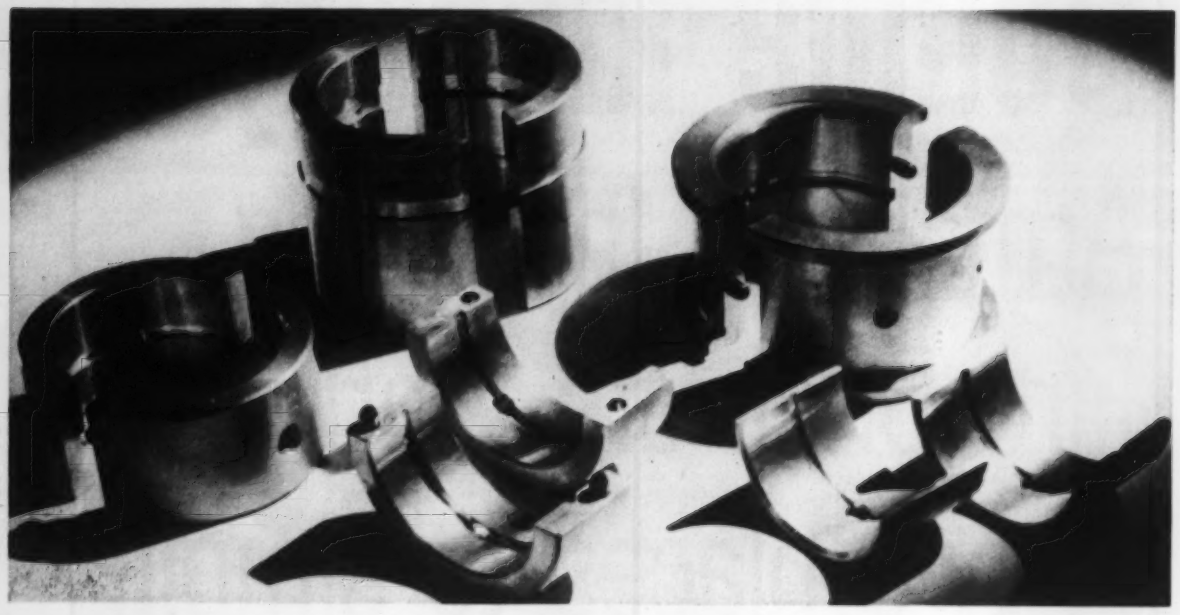
To make it easy to get the right brick in the right place quickly, every Armstrong Insulating Fire Brick is double-identified. One face bears the brick type stenciled clearly, while one end is marked with a colored dot. The color varies with brick type. This double-identification is a double check against error on jobs where several types of brick are being used.

For a free new booklet giving full information on Armstrong Insulating Refractories, write Armstrong Cork Company, 2708 Reed Ave., Lancaster, Penna. The next time you have a furnace lining or building job, you'll find your Armstrong engineer's knowledge of refractories a big help.

Armstrong INSULATING REFRACTORIES



PART II—PICKING THE RIGHT BEARING



WHICH SLEEVE BEARING?

A Guide to Bearing and Bushing Choice

By J. B. Mohler
Consultant
Newcastle, Pa.

THE SLEEVE BEARING buyer picks a material or construction on the basis of cost and performance.

Cost rules out some materials at the start; otherwise, gold would be an important bearing material. On top of initial cost, there is maintenance cost, which is also a measure of performance.

Aircraft and automobile companies employ continuous testing to find the best and most economical bearings. Such programs can bring real savings, but low-volume users may not be able to afford them. They'll select bearings from handbook data and by comparison with similar uses.

Performance — How a bearing will perform often can be estimated from its properties. (For a discussion of bearing properties, see part I of this article, STEEL, Aug. 1, p. 76.) When selecting a bearing for a new application in which speed and load requirements are critical, it is a good idea to consider bearings used in comparable situations.

Is bearing load your problem? Table 3 gives the approximate load capacity rating for bearing materials used on a steel back in internal combustion engines. They will operate for 1000 to 2000 hours as connecting rod bearings on a 2-in. shaft at 2000 to 4000 rpm. At a road speed of 50 mph, they will give 50,000 to 100,000 miles of service. As the horsepower of an engine is increased, the manufacturer uses the bearings that are nearer to the top of the table.

Fatigue—Heavier load bearings cost more, but price is not a measure of quality. Babbitt should be preferred for many uses where load is not a limiting factor.

Fatigue resistance may be more important (see Table 3). On this basis, silver on steel with an overlay would have a rating of about 6000 psi. In fact, a silver grid bearing has been used in a tank engine where bearings were exposed to a lot of sand.

Table 4 shows how materials rate for electric motor bushings, based on heavy-duty service and changing loads. For a 1-in. shaft and 1800 rpm, expected life would be 5000 to 20,000 hours.

What Criterion? — Offhand, a look at electric motor bushing service (compared with connect-

TABLE NO. 3.

Load Capacity of Steel-Backed Bearings for Internal Combustion Engines

(Based on fatigue-failure)

Material	Load Capacity
Aluminum	5,000 psi
Overlay on copper-lead	4,000 psi
Micro-babbitt	3,000 psi
Copper-lead	3,000 psi
Babbitt	2,000 psi

ing rod bearing service) might lead to the conclusion that for one-tenth the life one could use ten times the load. This is not true. Connecting rod ratings are based on fatigue failure, electric motor bushings on wear. Although babbitt bearings will wear more rapidly than bronze, they are preferred in many cases. They run cooler and do not cause so much shaft wear as bronze.

Lubrication—Of course, the selection of a material is only half the story. The other half is lubrication. Oil or lubricant must be supplied to the bearing surface.

Wicks, oil cups, pressure feed, drip feed, oil rings, splash, solid lubricant in the surface, porous oil-containing bearings are common methods. Proper design of oil holes, oil grooves, oil spreaders, mud pockets and outlets is just as important as selecting the proper lubricant and lubricating method.

New Look—Imagination in bearing design as well as choice of material can go a long way toward making a better product. A manufacturer of inboard motorboat engines found he could make the center main bearing do double duty as a bearing and valve by choosing bronze.

A maker of hand lawnmowers has gone to plastic sleeve bearings for the wheels of his lightest model. They'll wear out in time, but they are as easy to replace as a phonograph needle.

How long has it been since you pinpointed sleeve bearings and bushings as an area where costs could be pared and product improved? With so many types to choose from, they're worth a long second look.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Department,* STEEL, *Penton Bldg., Cleveland 13, O.*

TABLE NO. 4.

Load Capacity of Electric Motor Bearings

(Based on wear)

Material	Load Capacity
Bronze	200 psi
Copper-lead on steel	150 psi
Babbitt on steel	100 psi
Babbitt on bronze	50 psi
Sintered bronze	50 psi

SLEEVE BEARING SELECTOR

POURED OR MACHINED BABBITT—Use for older machinery; high-speed, light-load applications; and limited production items, when price rather than load is the limiting factor.

CAST BRONZE—Use for heavy-duty service where speeds are not excessive (roll neck bearings, cable drum bearings); heavy loads where relative motion is limited (pistonpin bearings); light loads where demand for surface properties is not great (instruments, fractional - horsepower motors, light-duty machinery); corrosion resistance (pumps); and applications where a bronze casting can function both as a bearing and as part of the machine. A good general bearing material.

WROUGHT BRONZE — Use for low cost applications where the bearing can be pressed into a hole (wristpin, pistonpin, knucklepin bearings).

SINTERED BRONZE — Use for light loads (home appliances). They hold oil, but film is thin.

BABBITT ON BRONZE — Use where heavy backing is no objection and shaft must be protected if babbitt wears away (railway journal bearings, connecting rod and main bearings for large internal combustion engines).

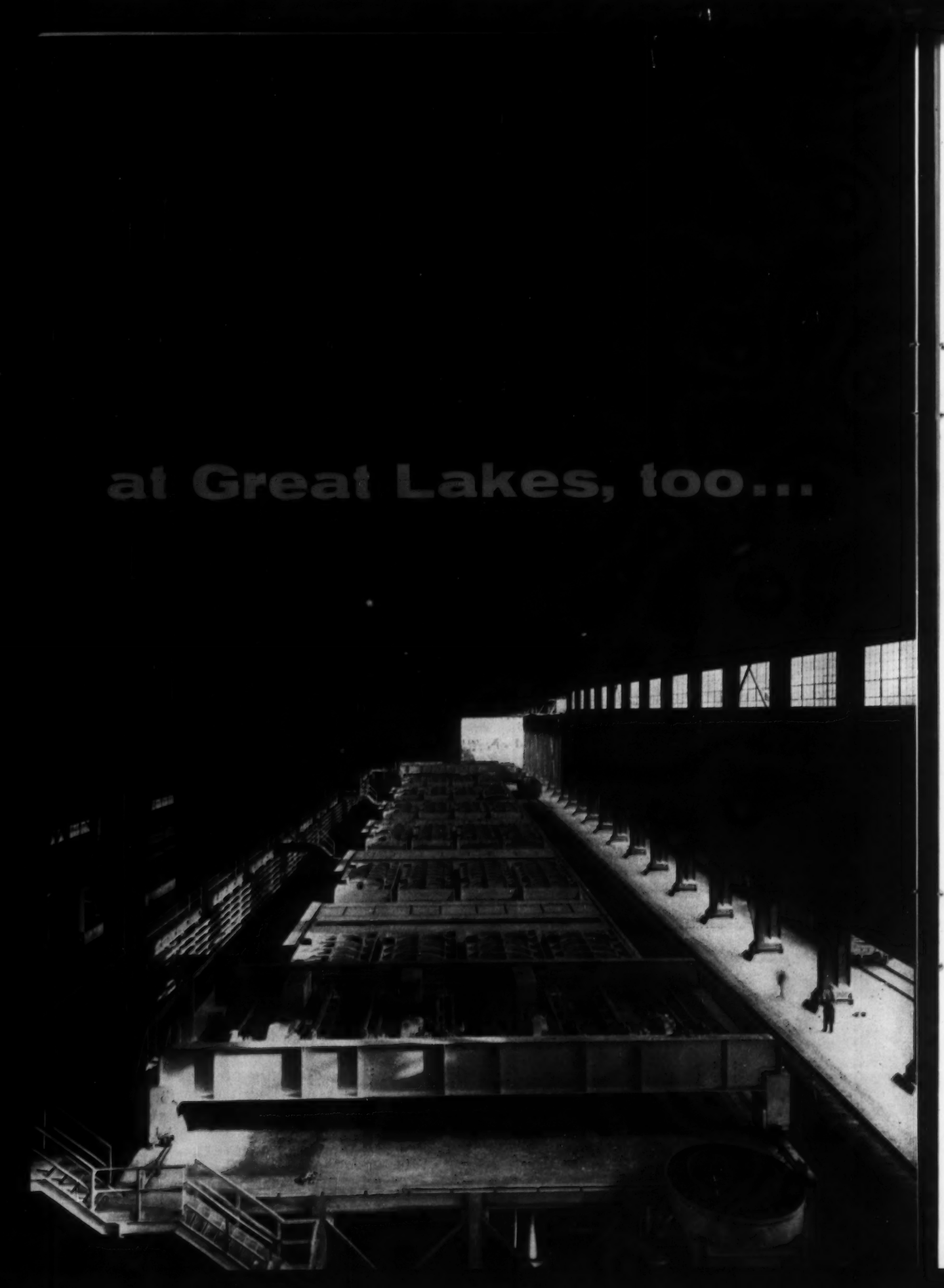
BABBITT ON STEEL — Use for light loads (motors, turbines, generators, automotive connecting rods, oil pumps, camshafts and main bearings). Common.

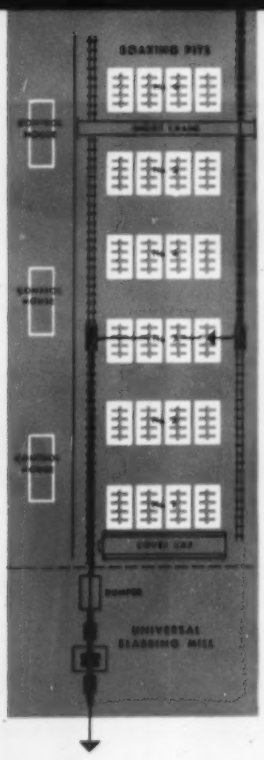
BRONZE ON STEEL—Use where load is too heavy for babbitt on steel.

COPPER-LEAD ON STEEL—Use for heavier loads than bronze on steel can take.

ALUMINUM ON STEEL—Use for heavier loads than copper-lead on steel (connecting rods and main bearings) can take.

SILVER ON STEEL—Use for extra-heavy loads and speeds (aircraft engines).


at Great Lakes, too...



high-production soaking pits

. . . a convincing example of 'Surface' leadership. Behind the story of these 24 soaking pits at Great Lakes Steel, Detroit Division of National Steel Corporation, is an imposing record of achievement: Surface Combustion has built 80% of all new pits since World War II.

At Great Lakes, six batteries, four 'Surface' pits in each, heat low carbon steel ingots for automotive and appliance steel. They also heat some low alloy steel ("NAX" grade). Capacity will be still further increased by the addition of 16 new 'Surface' pits now being built.

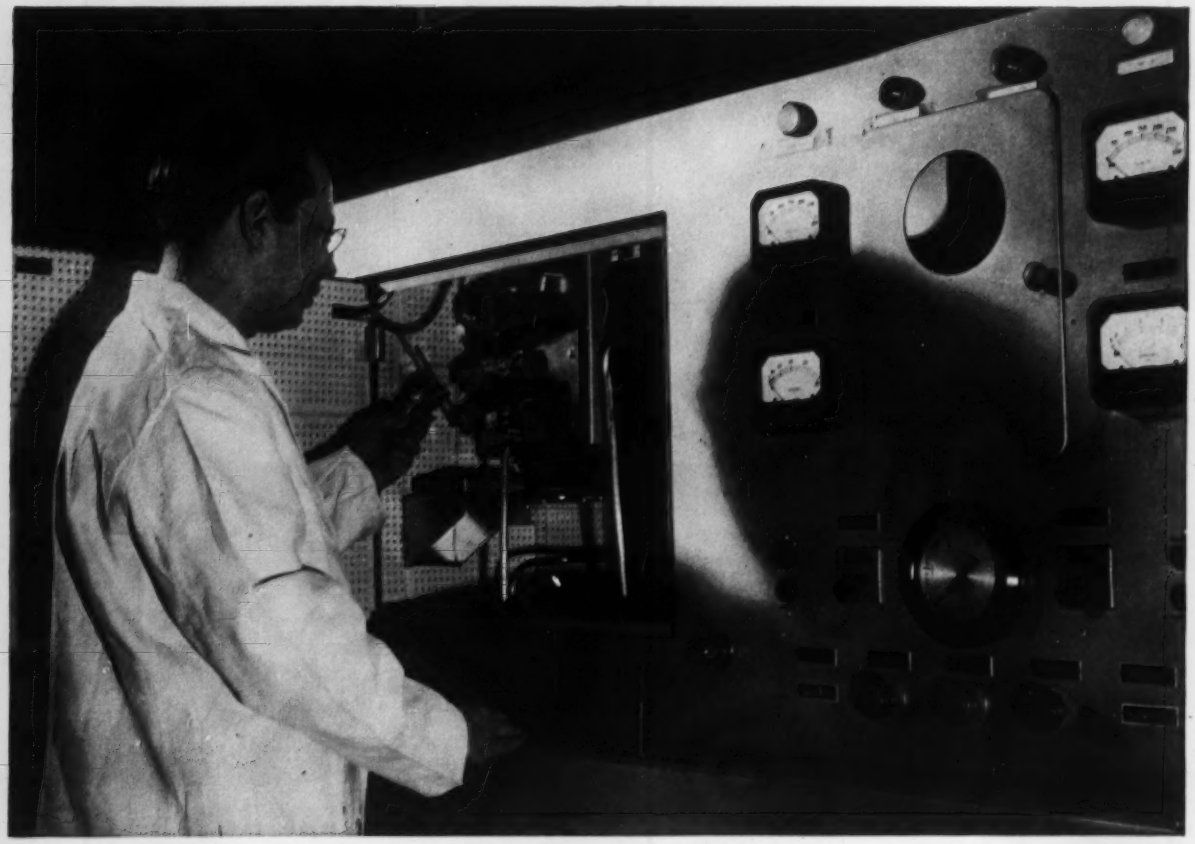
These one-way-fired pits include such 'Surface' features as the efficient jet pump recuperative system, and integrated temperature and combustion controls which are of the most modern design. The performance of these pits, and many others, is among the reasons why steelmakers depend on 'Surface.'

SURFACE COMBUSTION CORPORATION, TOLEDO, OHIO

Surface
STEEL MILL FURNACES

Foreign affiliate companies:

British Furnaces, Ltd., Chesterfield; Stein & Atkinson, Ltd., London
Stein & Roubaix, Paris, Liege, and Genoa; Chugai Ro Kogyo Kaisha, Ltd., Osaka
Benno Schilde Maschinenbau, A.G., Bad Hersfeld (Hessen, Germany)



This man wants to help you...

Laboratory and Pilot Plant-Scale Development of New Products is an important phase of VCA's Technical Service. Special laboratory equipment makes possible accurate observation of ferro alloy behavior and the improvement of metallurgical processes.

As part of a team of metallurgists and chemists at our Research Center, helping you is his job!

He works closely with customer staffs, studying and evaluating problems inherent in the production of iron, steel, aluminum and special alloys.

He searches for new products...new processes...new sources of raw materials. He makes possible the high quality and dependability of every Vancoram product. He is our firm assurance that we can serve the metals industry with finer, ever more versatile alloys—now and in the future.

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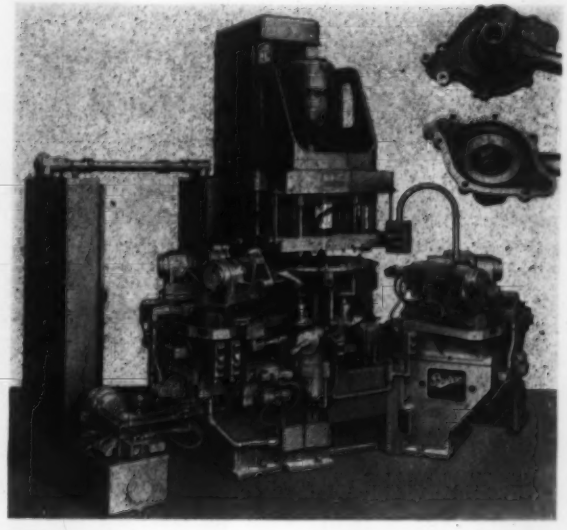
Drilling and Tapping Machine Performs 19 Operations



This five-way drilling and tapping machine is used by Plymouth Motor Co. to machine water pump bodies. Production rate is 135 pieces an hour.

Six single-place holding fixtures are actuated by a torque-controlled power wrench, which is mounted on an index table (36 in. in diameter) with a shot bolt.

Automatic chip removal is featured. Parts are completely interchangeable. Tolerances are closely held and component assemblies are located by precision-bored dowels. All multiple heads are of ball bearing construction.

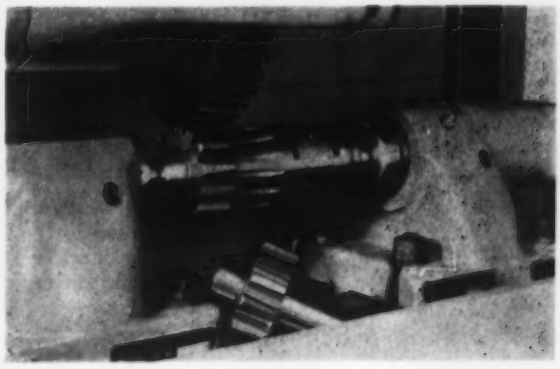
Tap spindles are precision ground and have hard chrome-plated threads. Automatic index of the cam-and-roller type is controlled electrically. Laminated tool steel ways are hardened and ground.

Another machine completes machining of the pump bodies. It performs 11 operations (including spotfacing, countersinking, recessing, tapping and finish-boring) on 135 pieces per hour. *Write:* Buhr Machine Tool Co., Ann Arbor, Mich. *Phone:* Normandy 2-5646

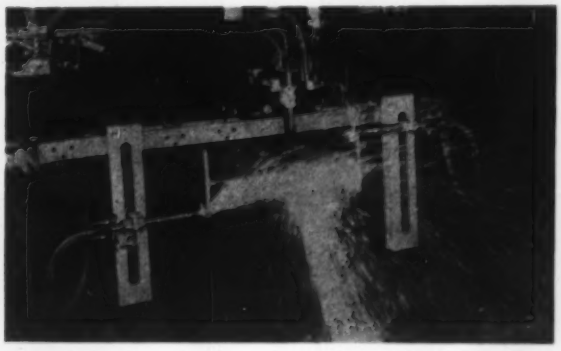
New Process To Shave Teeth on Steering Gear Segments

A patented conical helical shaving cutter produces involute (taper-toothed) gears that meet rigid engineering specifications for surface finish, size and accuracy of taper. The steering gears made maintain initial backlash settings and operate smoothly at all positions.

Operation of a pushbutton control causes the work gear assembly to feed across the cutter on a diagonal path at 90 degrees to the cutter centerline. This saves about half the time required by conventional shaving methods. *Write:* National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich. *Phone:* Walnut 1-8980



Flame Saw Cuts 24-in. Beam in 1 Minute



Only a 110-volt power supply, oxygen and fuel gas are needed to cut heavy steel structurals. Hand-portable, the saw reduces handling, setup and operating costs and increases speed and accuracy of cutting at any angle.

The work is the table—just slide the flame saw to position, set torch distance, light the master manifold-controlled torches and start cutting.

An extra length of track and a radius rod make the saw adaptable to any straight line or circle cutting job. An angle miter cut on 3 to 36-in. structurals can be made. *Write:* K-G Equipment Co. Inc., Allentown, Pa. *Phone:* Hemlock 5-4761

NEW PRODUCTS and equipment

Metal Marking

Electrolytic action is used to permanently mark all finished metal surfaces. No stress, strain, burrs or deformation are set up in the part.

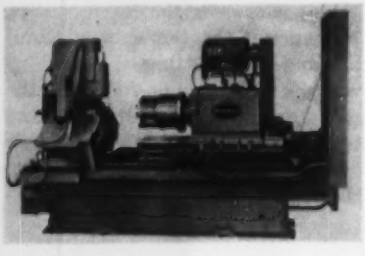
Applications include production and inspection code numbers, trademarks and specialty marking.

Six sizes are available. Circular sizes range from 3/16 to 1 in. in diameter. Rectangular marks also are available. *Write*: Lectroetch Co., 14925 Elderwood Ave., East Cleveland 12, O. *Phone*: Glenville 1-8080

Gun Drilling Maching

This new, high production machine will eliminate up to six machine tools and save both time and manpower while maintaining extreme accuracy.

It drills six holes (0.5102 to 0.5107 in. in diameter) in a carrier gear. It drills to size, within 0.005 in.; and to location, within 0.001 in. Production: 400 parts in an 8-hr shift.

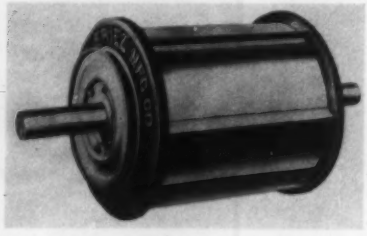


Three different parts are handled, from 6 to 12 in. in diameter. Change-over takes 3 minutes.

The machine is the horizontal-way-type, with hydraulically operated bushing position slides. *Write*: Michigan Drill Head Co., P.O. Box 4643, Detroit 34, Mich. *Phone*: Jordan 4-5841

Magnetic Drum

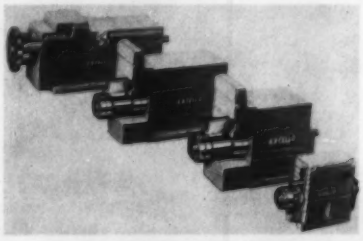
This permanent-magnet drum separates small iron particles from nonmagnetic turnings, borings and chips. Units are available in 12 and 18 in. diameters. Widths range from 10 to 38 in.



A ribbed stainless steel shell encloses a stationary bank of magnetic elements around which the shell revolves. The agitator drum is furnished with or without housings. *Write*: Eriez Mfg. Co., Erie 6, Pa. *Phone*: 4-0133

Hydraulic Power Units

New models provide automatic cycles for production machines. They are used for feeding and rotating cutting tools or driving multiple spindle heads and are especially suited for automatic drilling, reaming, counterboring and spotfacing. Step drilling equipment is incorporated.



In step drilling, the hole is drilled in successive steps. The unit is cycled to drill to a predetermined depth, retract to allow coolant to flow to the drill point, clear chips and return in rapid traverse to about 1/16-in., of the previous drill depth. Drilling is continued automatically, and the cycle is repeated until depth is reached. *Write*: Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. *Phone*: Townsend 8-3900

Paper Tape

Industrial operations are speeded by this quick-sticking, pressure-sensitive, general-purpose tape.

Applications: Masking for protection and color separation, holding small parts in transit, sealing containers and reinforcing packages.

The tape unwinds easily, adheres readily to complex contours as well as flats. Its flexible crepe paper backing resists heat, moisture and stains.

Tensile strength is 20 lb per inch of width; adhesive strength is 35 oz. Elongation is 12 per cent.

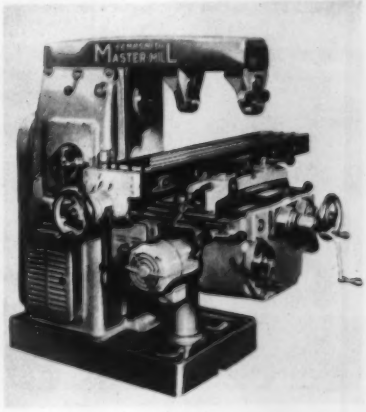
The tape is available in 60-yd boxed rolls in standard widths from ¼ to 3 in. *Write*: Behr-Manning Division, Norton Co., Troy, N. Y. *Phone*: Arsenal 3-0100

Acid Handling Hose

Hysunite will handle heavy concentrations of three highly corrosive acids: Sulphuric up to 96 per cent, nitric up to 70 per cent and chromic up to 100 per cent concentration. *Write:* Industrial Products Division, Goodyear Tire & Rubber Co., Akron 16, O. *Phone:* Franklin, 6-1411

Milling Machine

This knee-type milling machine has a taper spindle powered by an individual drive motor through a gear train that provides 18 speed



Chromewear

for the really tough abrasive jobs*

U. S. Patent 2,174,266

HIGHEST ABRASION-RESISTING STEEL

Independent laboratory tests have shown that CHROMEWEAR has abrasion resistance more than 30 times that of 1% carbon tool steel and 6 times that of high carbon-high chromium tool steels. No other known steel exceeds CHROMEWEAR in this respect. Wherever maximum wear resistance is required, with machining kept to a minimum, CHROMEWEAR is your outstanding choice. Typical uses are brick mold liners, liners for sand blast machines and sand slingers, drawing dies, ceramic molds, extrusion dies for ceramics. There is a Vanadium-Alloys Steel Company office near you for consultation and the prompt handling of your inquiries.

*brick mold liners, for example

No other steel has outperformed CHROMEWEAR for brick mold liners

made by the originators of High-Vanadium Steels

VANADIUM-ALLOYS STEEL COMPANY was first to produce 18-4-1 and 18-4-2 high speed steel, first to produce M-2, M-4 (Neatro) and T-15 (Vasco Supreme) high-Vanadium high speed steels—all nationally known for first quality performance over a wide range of applications.

VANADIUM-ALLOYS STEEL COMPANY

Manufacturers of First Quality Tool and Die Steels

Latrobe, Pennsylvania

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL CO.

In Canada:

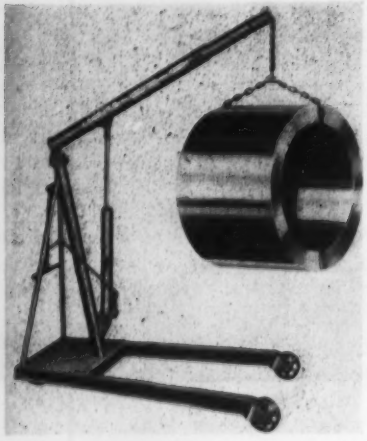
Vanadium-Alloys Steel Canada Limited, London, Ontario

changes—from 25 to 1500 rpm.

Two sizes are built with 7½-to-10-hp spindle drive and 1½-to-2-hp feed drive motors. An electrical spindle control is used. High speed power rapid traverse is provided. Speed and feed changes are made through direct reading dials. *Write*: Kempsmith Machine Co., Milwaukee 14, Wis. *Phone*: Greenfield 6-3625

Mobile Crane

A telescoping boom adds height and reach to this mobile crane. It comes in ½, 1 and 2-ton models. The unit is 61 in. long and 32 in. wide; it turns completely in its own length. Welded girder-type construction and wide stabilizers

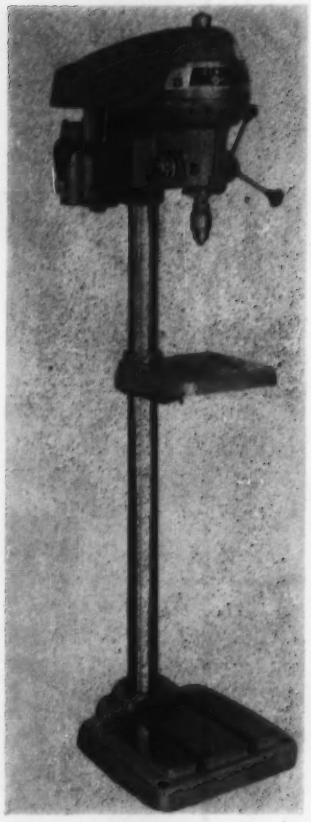


assure maximum stability. Antifriction bearings and large casters permit easy movement of unit and load. *Write*: Lempco Industrial Inc., 5497 Dunham Rd., Bedford, O. *Phone*: Montrose 2-2400

Drilling Machines

New 16-in. machines are available in single spindle bench and floor models and single and multiple spindle production bench models. They are rated at ½-in. capacity in cast iron, with an 1800 rpm motor. A 0-to-½-in.-capacity chuck is mounted on a taper plug spindle.

A six-splined spindle is full floating on four precision, sealed, lifetime lubricated bearings. Five spindle speeds range from 410 to 4840 rpm. Speed changes are made



easy by a tilting motor bracket which also maintains uniform belt tension.

The direct-reading depth dial incorporates a positive stop. The hand-feed mechanism has three levers with big, colorful knobs for operator safety and comfort. Tables and bases have machined working surfaces. *Write*: Cincinnati Lathe & Tool Co., Cincinnati 9, O. *Phone*: Redwood 2121

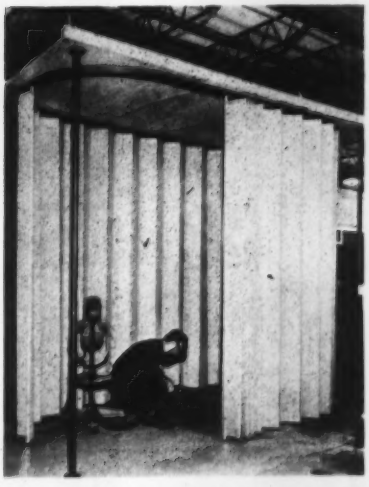
Welding Positioner

Pieces weighing up to 1000 lb are positioned for downhand welding by this universal-balance positioner.

The operator merely clamps the workpiece to the table and adjusts the spring tension with the crank. The unit stays in static balance, even though the weldment is rotated or moved horizontally or vertically. With a touch of the hand, the operator can guide it to the precise angle he wants as work progresses. *Write*: Harnischfeger Corp., Milwaukee 46, Wis. *Phone*: Orchard 1-4400

Noise Control

A lightweight sound barrier curtain is retractable for materials movement. It is easily installed. Tests conducted in the chipping department of a foundry showed a noise reduction of 15 decibels. Readings were taken 6 ft from a



chipping hammer. *Write*: Bemis Bros. Bag Co., Physical Research Dept., 325T 27th Ave. N. E., Minneapolis, Minn. *Phone*: Sterling 1-4887

Coupling Link

Slings and special assemblies can be made by alloy chain users with this new coupling link. Eliminated: The time required for ordering and shipping new or repaired assemblies from the factory.

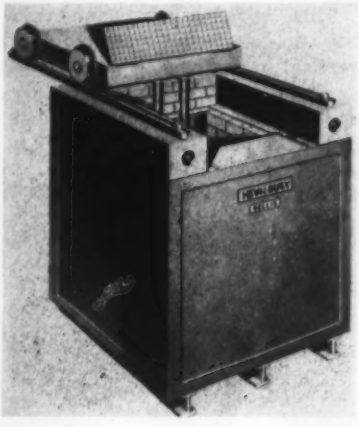
The link has a pair of body halves, a tubular stud and a hardened alloy steel pin. Once assembled (a matter of seconds), it is securely locked by the steel pin which bites into the steel stud.

Links are forged from an alloy steel and heat treated. They can be used to join hooks and large

links to body chain. *Write*: Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Salt Bath Furnaces

These immersed-electrode-type furnaces are available in any size or capacity, with temperatures ranging from 300 to 2400° F. The hot salt heats each part rapidly and uniformly. It protects work by sealing off the atmosphere—there are no scale oxidation or decarburization problems. Ceramic, steel and alloy pots are used.



Electrodes have water-cooled terminals. Pots are removable, to allow a single furnace to be used for operations requiring different pots and salts. *Write*: Hevi Duty Electric Co., Milwaukee 1, Wis. *Phone*: West 3-2756

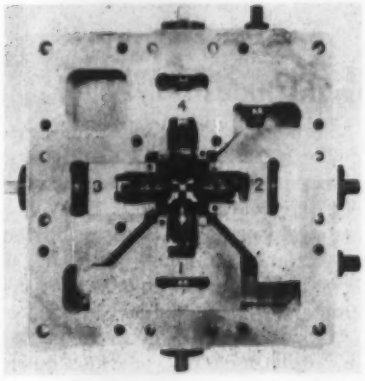
Soldering Flux

This self-cleaning, nonacid flux can be used with 40-60, 50-50, 60-40 and 95-5 solders. When heated, the flux flows by capillary action through surface oil film and disperses any metal oxides present. The attraction of the solder for metal forces the flux from the metal, leaving no residue. No wire brushing or sanding is needed.

The flux comes in a 2-ounce can for those who have occasional use for it. *Write:* Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill. *Phone:* Sacramento 2-6085

Turks Head

New design permits the forming of most special shapes with a simple roll change and the forming of all conventional squares and rectangles within the head's capacity by simple roll adjustment.



This is done by separate adjusting screws which control horizontal and vertical adjustments of slides 1 and 2. Slide 3 is capable of horizontal adjustment only while slide 4 is adjusted vertically. The turks head may be set for either universal or special operation.

Increased bearing capacities give higher production speeds; over-all time for roll setting has been reduced. *Write:* Fenn Mfg. Co., Fenn Rd., Newington, Conn.

Tape Controlled Table

This electronic digital positioning table automatically positions a workpiece under or in front of a drill, tap or boring tool. Many manual movements are eliminated.

Control is completely in the tape; the operator is not responsible for hole spacing. The necessity of making jigs, special measuring rods or adjustable screw rods is eliminated.

The table can be moved in 0.001-in. increments. Several hundred holes can be drilled in the work without resetting. Work table positioning capacity is 20 x 30 in. Accuracy of positioning is 0.001 in.

in 10 in. *Write:* Arter Grinding Machine Co., 15 Sagamore Rd., Worcester 5, Mass. *Phone:* Pleasant 6-6227

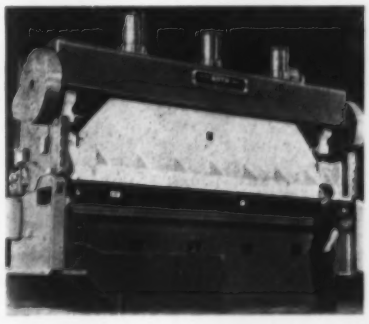
Magnesium Pallet Dollies

A new line of magnesium pallet dollies features extruded magnesium frames, hardened steel axles and phenolic resin rollers with sealed bearings. Pallets are available in a range between 36 x 36 in. and 48 x 48 in.

Although capacities go to 4000 lb, the average model weighs only 37 lb. *Write:* Magnesium Co. of America, Materials Handling Division, East Chicago, Ill. *Phone:* 4200

150-Ton, Press Type Brake

This 16-ft press can be used for piercing, blanking and shallow drawwork on unusually large sheet panels. Bed and ram areas



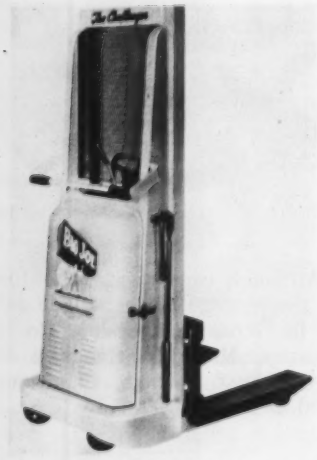
are 40 in. wide and 15 ft 8 in. long.

The machine weighs 35 tons without die sets. It is equipped with three air counterbalance cylinders. Stroke is 5 in., shut height between platens is 14 in.

Features are extra-large, formica-lined slide areas, pneumatic clutch and brake, automatic overload release mechanism and press-type electrical safety controls. Foot controls are interlocked. *Write:* Cyril Bath Co., 32290 Aurora Rd., Solon, O. *Phone:* Churchill 8-6511

Hydraulic Lift

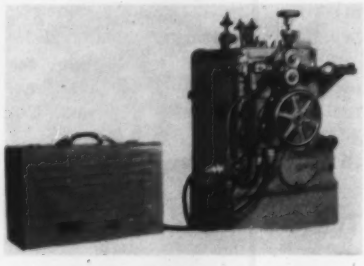
Maximum load capacity of this new 12-volt, battery-operated lift is 1000 lb. Top lifting speed is 40 fpm. The unit is planned to be economical in areas requiring only occasional use. Lifting height is 56 in.



The unit handles in 28-in. aisles, is suited for transferring dies, tailgate unloading and stacking drums, crates, appliances, skids and pallets. *Write:* Big Joe Mfg. Co., 902 West Jackson Blvd., Chicago 6, Ill. *Phone:* Taylor 9-5650

Spring Gage

This electronic gage is for use on automatic spring coilers. It measures tolerances on the free length of each spring as it is coiled, automatically accepting those which meet specifications and rejecting those which are too short or too long.

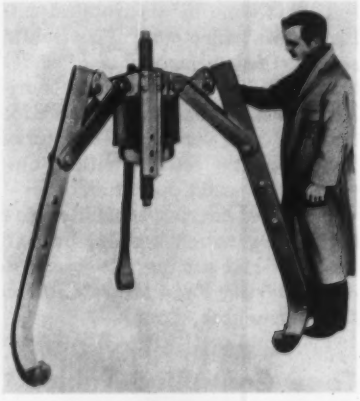


Expensive hand measuring is eliminated. Lengths can be held to ± 0.001 in. The gage measures spring lengths from ⅛ to 4 in. to any tolerance desired as fast as they can be coiled. *Write:* Carlson Co., 277 Broadway, New York 7, N. Y. *Phone:* Barclay 7-2552

Giant Industrial Puller

Here is a 100-ton, triple-grip puller for big, tough jobs on large diameter wheels, sheaves, sprockets and gears.

Jaws permit a 34½-in. reach for a maximum diameter of 48 in., a 36½-in. reach for a maximum diameter of 36 in. and a 38 in. reach for a top diameter of 24 in. A 36-in. adjusting screw provides quick



adjustment to the work and permits use of the full 5-in. ram piston travel. *Write:* Owatonna Tool Co., 398 N. Cedar St., Owatonna, Minn. *Phone:* 2339

Automatic Plating

Here is a production plating mechanism with a replaceable plastic tank that enables the plater to change from cadmium to zinc in minutes. The plating tank is electrically isolated from the rest of the mechanism to eliminate the possibility of stray currents.

A constant, dependable current flow is assured by three-point contact of work carriers. Tanks are sectionalized at the factory to meet specs. Racks are 12 x 6 x 30 in.

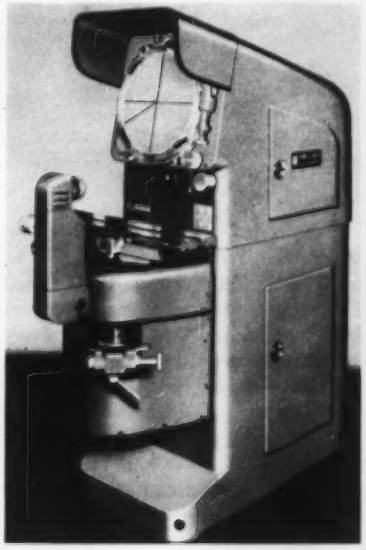
The unit is hydraulically powered for smooth, part transfer. One 3-hp motor runs the entire mechanism through two hydrometers. *Write:* Platocrat Division, Wagner Bros. Inc., 433 Midland Ave., Detroit 3, Mich. *Phone:* Tulsa 3-0100

Burr Removal

A mildly acidic material for use in finishing barrels, Oakite FM 184 removes burrs, heat scale and rust. It improves the color of steel after alkaline abrasive deburring. In field tests the material has been found effective on copper rivets, steel and copper tool parts, steel bobbins, stainless steel screw inserts and brass. *Write:* Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone:* Whitehall 3-0940

Optical Comparators

This 14-in. screen camparator has an electronic variable-speed vertical measuring control. The workpiece may be raised or lowered, slowly or rapidly, for quick, precise measurements to 0.0001 in. Angle measurements are read to the exact minute.



All lens systems have a 6½-in. focal length providing generous clearance in the staging area. *Write:* Jones & Lamson Machine Co., Springfield, Vt.

NEW literature

Write directly to the company for a copy

Precision Measurement Catalog

Text gives valuable technical and engineering information on problems and methods—catalog 36, 258 pages. Van Keuren Co., 176 Waltham St., Watertown, Boston, Mass.

Honing

Here is information on where and how honing can be used profitably—form X-MAN-5000F, 8 pages. Sunnen Products Co., 7910 Manchester, St. Louis 17, Mo.

Tube Mills

Universal-drive tube mills that shape without excessive stretching of edges are described in brochure on continuous weld tube mills—Abbey Etna Co., 3400 Maplewood Ave., Toledo 10, O.

Concrete Floor Care

Basic concrete floor, its care and maintenance are described in this booklet—12 pages. National Sanitary Supply Association, Suite 1105, 139 N. Clark St., Chicago 2, Ill.

Surface Measurement

Instruments for measuring surface roughness are listed. Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, O.

Program Control

"Program Control of Process Variables" describes the methods and advantages of using automatic, time-conditions control for industrial processes and tests—bulletin 1130, 24 pages. Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Ave., Philadelphia 44, Pa.

Plunger Pumps

Vertical triplex single-acting pumps with 2, 4, 5 and 6-in. strokes are described. Size, speed, displacement and discharge pressure are listed by a rating chart—bulletin W-414-B45A, 12 pages. Worthington Corp., Advertising & Sales Promotion Dept., Harrison, N. J.

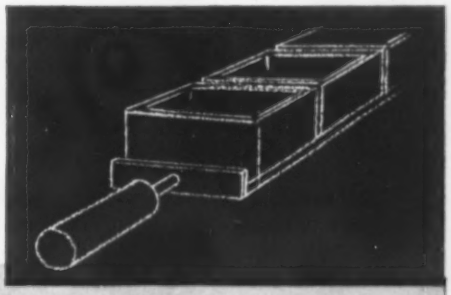
Liquefied Petroleum Gas

Fork lift trucks fueled by liquefied petroleum gas are depicted—4 pages. Towmotor Corp., 1226 E. 152nd St., Cleveland 10, O.

Reamers

Dimensions of standard reamers, blanks and cutters are tabulated—20 pages. Lavallee & Ide Inc., Chicopee, Mass.

HOLCROFT and the PUSHER FURNACE



An Answer to Stock Handling Problems

When it's time to select a new heat treat furnace, a good move is to consult a specialist—one who understands all phases of the job. Such a specialist is Holcroft. A thorough study of your problem will result in basic recommendations designed to improve quality control—pare costs—give production a lift.

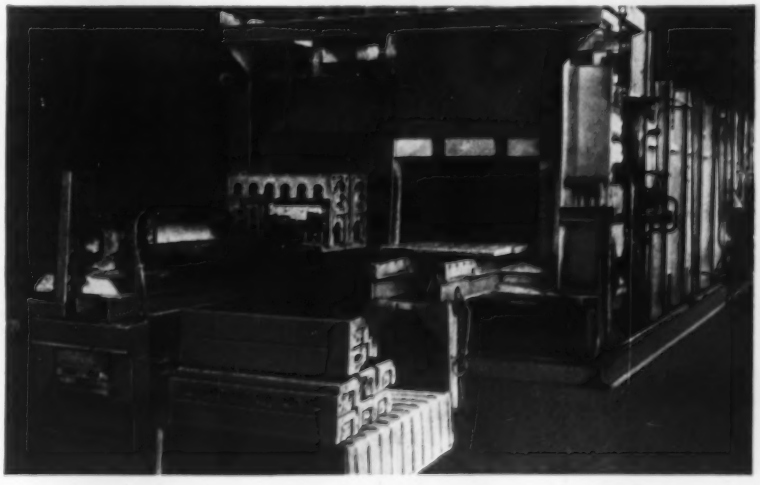
One factor involved in selecting a furnace is the decision as to which type of stock handling will do the job best. A pusher-type furnace—because of its low cost—is often the answer. Stock may be pushed through the heat treat cycles in one of four different ways: on trays, on pusher blocks, in cars, or with one part pushing the other.

Methods of handling stock are discussed in Holcroft's book "Blazing the Heat Treat Trail". It's a good idea to have a copy (just write) in your files. And it's a better idea to call Holcroft when you have a problem. Do it today!

HOLCROFT & CO., 6545 Epworth Boulevard, Detroit 10, Michigan.

HOLCROFT & COMPANY DETROIT MICH. PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. CLEVELAND, OHIO DARIEN, CONN.
HOUSTON, TEXAS LOS ANGELES, CALIF. PHILADELPHIA, PA.
CANADA: Walker Metal Products, Ltd., Windsor, Ontario



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Your Carpenter Representative is the lead-off man for a team of specialists devoted to helping you get full value from tool, alloy or stainless steels. His friendly, willing assistance to work with you at any time is backed by these many advantages that can mean less worry . . . greater economy . . . improved results for you on job after job.

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Carpenter **STEEL**

Mill-Branch Warehouse Service

SPECIALTY TOOL • ALLOY and STAINLESS STEELS

Market Outlook

THIS YEAR'S steel business is practically wrapped up. Order books for some products have been closed for the rest of 1955 by some producers. On other products, some steel mills have only six weeks of space left.

SIGN OF THE TIMES—Proof of the strength of demand is a couple of price increases: Phoenix Iron & Steel Co., Phoenixville, Pa., raised standard and wide flange structural sections above its competitors' prices. Central Iron & Steel Co., Harrisburg, Pa., did likewise on carbon plates. Both companies, subsidiaries of Barium Steel Corp., sell below their competitors' prices when business is soft and above when it is strong.

Phoenix is $10 a ton above its and its competitors' previous price, Central, $12.

THE CAUSE— The construction industry is the big taker of the products of Phoenix and Central. That industry is booming. The American Institute of Steel Construction reports June bookings of orders for fabricated structural steel were the highest since those of April, 1951, when the Korean War was a strong stimulant. And orders still are rolling in! Heading the list are a couple king-size ones—each for approximately 30,000 tons of structurals. Projects: Two new plants for the Fisher Body Division of General Motors Corp. One will be at Marion, Ind., the other at Mansfield, O. American Bridge Division of U. S. Steel Corp. will fill one order, and Bethlehem Steel Co. the other.

ACROSS-THE-BOARD—Structurals and plates are not the only products in strong demand. Practically every other product—except railroad rails—is, too. It had been thought orders for sheets and bars would decline this summer when the automobile industry starts model change-overs. Change-overs are beginning, but steel demand is not slipping.

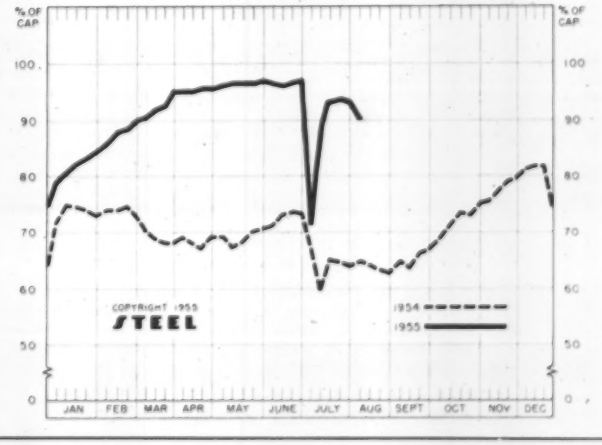
A LOOK AHEAD—How long can steel demand remain high? That's a question frequently heard. Steel producers are not afraid of the future. They're charting expansions. One of the industries counted on as a growing outlet for steel is air conditioning. National Steel Corp., Pittsburgh, says that by 1960, air conditioning will be in half of all new homes in the United States, in one-fourth of all new automobiles, busses, office buildings and in most hospitals.

TROUBLES—Already, the air conditioning industry is making itself felt as a steel user. More than 200 industries use air conditioning for almost as many reasons. To supply this industry and other consumers, the steel industry is pushing hard, but it's encountering handicaps, such as hot weather, equipment breakdowns and labor trouble.

In the week ended Aug. 7, the nation's steel ingot output declined 3 points to 90 per cent of capacity.

HIGHER PRICES—Prices are still climbing. The increases by Phoenix and Central pushed STEEL's price composite on finished steel up to $127.41 a net ton, a 77-cent rise. Also up is STEEL's price composite on finished steel up to $43.17 a gross ton, highest since August, 1953. A week ago, the composite was $42. Aluminum also rose (see page 104). On Aug. 1, pig went up 1 cent and ingot, 1.2 cents.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of capacity engaged)

	Week Ended Aug. 7	Change	Same Week 1954	Same Week 1953
Pittsburgh	98.5	+ 3.5*	61	95
Chicago	96	+ 2*	68.5	98.5
Mid-Atlantic	93	— 1	57	96.5
Youngstown	95	— 3	65	106
Wheeling	97.5	+ 5	78	97
Cleveland	97	+ 5*	59.5	104
Buffalo	105	0	56	106.5
Birmingham	21	—72.5	75	95.5
New England	83	+ 1	45	90
Cincinnati	85	— 1	57.5	88.5
St. Louis	103.5	+ 6	47.5	103
Detroit	86.5	— 3	56.5	106
Western	102	+ 1	82	101
National Rate	90	— 3	64.5	96.5

INGOT PRODUCTION‡

	Week Ended Aug. 7	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	141.8†	136.3	129.0	95.1
NET TONS (In thousands)	2,278†	2,190	2,073	1,527

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Aug. 2 1955	July 26 1955	Month Ago	July Average
(1947-1949=100)	153.9	153.9	144.9	153.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 2

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.130
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6 75 Cr 4 5 V 2.1, Mo 5.5, C 0.80 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W 18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	180.952
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.533
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.233
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.333
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless, 430 (lb)	0.575
Bars, C.F., Stainless, 302 (lb)	0.468	Bale Ties (bundle)	6.473
Sheets, H.R., Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Aug. 3 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	207.63	207.63	207.63	195.87	156.69
Index in cents per lb	5.625	5.625	5.625	5.306	4.245

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$127.41	$126.64	$118.45	$117.43	$94.36
No. 2 Fdry, Pig Iron, GT	58.99	58.99	56.54	56.54	46.85
Basic Pig Iron, GT	58.49	58.49	56.04	56.04	45.97
Malleable Pig Iron, GT	59.77	59.77	57.27	57.27	47.49
Steelmaking Scrap, GT	42.83	42.00	35.00	27.33	37.33

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Aug. 3 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.45
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.45
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55	3.93
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40	4.10-4.15
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25	3.40
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.40
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53	3.42
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.50
Plates, Chicago	4.50	4.50	4.50	4.225	3.50
Plates, Coatesville, Pa.	4.50	4.50	4.50	4.225	3.60
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.50
Plates, Claymont, Del.	4.50	4.50	4.50	4.225	3.60
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.35
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.35
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.10
Sheets, C.R., Detroit	5.325-5.425	5.325-5.42	5.425	5.10	4.30
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.40
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.25-3.50
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.25
Strip, C.R., Pittsburgh	6.317	6.317	6.25	5.95	4.15-4.50
Strip, C.R., Chicago	6.35-6.45	6.35-6.55	6.45-6.55	6.00	4.30
Strip, C.R., Detroit	6.35	6.35	6.35-6.55	5.90	4.35-4.95
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75	4.50
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.30
Tin plate (1.50 lb), box, Pitts.	$9.05	$9.05	$9.05	$8.95	$7.50

SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$78.00	$78.00	$63.00
Wire Rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.025	5.025	4.675	4.525	3.85

PIG IRON, Gross Ton					
Bessemer, Pitts.	$59.50	$59.50	$57.00	$57.00	$48.50
Basic, Valley	58.50	58.50	56.00	56.00	46.00
Basic, deld. Phila.	56.16	56.16	59.66	59.66	49.44
No. 2 Fdry, Pitts.	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, Chicago	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, Valley	59.00	59.00	56.50	56.50	46.50
No. 2 Fdry, deld. Phila.	59.66	59.66	55.16	60.16	49.94
No. 2 Fdry, Birm.	55.00	55.00	52.88	52.88	42.38
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	60.58	60.43	49.08
Malleable, Valley	59.00	59.00	56.50	56.50	46.50
Malleable, Chicago	59.00	59.00	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$43.00	$42.00	$38.50	$28.50	$41.00
No. 1 Heavy Melt, E. Pa.	44.50	43.00	39.00	24.50	33.00
No. 1 Heavy Melt, Chicago	42.00	41.00	36.00	29.00	38.00
No. 1 Heavy Melt, Valley	46.50	41.50	37.50	26.50	40.75
No. 1 Heavy Melt, Cleve.	44.00	39.50	35.00	24.50	38.50
No. 1 Heavy Melt, Buffalo	39.50	34.50	29.50	26.50	36.75
Rails, Rerolling, Chicago	64.50	61.50	55.50	43.50	48.50
No. 1 Cast, Chicago	45.50	45.50	43.50	35.50	44.50

COKE, Net Ton					
Beehive, Furn, Connisvl.	$13.75	$13.75	$13.75	$14.75	$14.25
Beehive, Fdry, Connisvl.	16.75	16.75	16.75	16.75	15.50
Oven, Fdry, Chcago	24.50	24.50	24.50	24.50	21.00

Daily Nonferrous Price Record

	Price Aug. 3	Last Change	Previous Price	July Avg.	June Avg.	July 1954 Avg.
Copper	36.00	Mar. 29, 1955	33.00	36.000	36.000	30.000
Lead	14.80	Oct. 4, 1954	14.55	14.800	14.800	13.800
Zinc	12.50	June 16, 1955	12.00	12.250	12.250	11.000
Tin	97.625	Aug. 3, 1955	97.375	97.045	93.668	96.558
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	23.20	Jan. 12, 1955	22.20	23.200	23.200	21.500
Magnesium	28.50	Mar. 21, 1955	27.00	28.500	28.500	27.000

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99+%, deld.; MAGNESIUM, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

for the exclusive fabrication of stainless and alloy steel products

The new plant shown above, now finished and in operation, permits us to fabricate stainless and alloy steels in a shop completely segregated from our carbon steel operations.

Purity is Paramount—From an experience of many years in making *both* carbon and alloy equipment for industry, it has been demonstrated that the ideal set-up is—*segregation.* For top quality it is better that high-grade alloy steels be not exposed to contamination by tools and equipment used to make ordinary carbon steel products.

Sun Ship's new Alloy Products Shop, therefore, marks a distinct step forward in a great and growing field. Chemical plants, oil refineries, atomic energy plants, and many other types of industry are finding more and more uses for equipment boasting the special strengths and virtues contributed only by alloy steels.

Every Size and Type—In this new shop we are working with all of the 300 or 400 series of alloys, clad steels and aluminum; and are fabricating such products as pressure vessels, tanks, towers, troughs, autoclaves, reactors, hoppers, kettles, platework and machinery. All sizes and types are handled; and pieces too long for delivery by rail can be shipped direct by water from our own docks on the Delaware.

Every Facility—The new shop is an integral part of Sun Ship's huge plant at Chester, Pa.—an impressive blend of steel fabricating shops, forge shops, boiler and tank shops, machine shops and every other facility needed for building the many types of made-to-order equipment required for modern industry.

For more specific information about our new Alloy Products Shop, for estimate, advice or a representative's personal call, just get in touch with our Sales Engineering Department. Your inquiry will receive prompt and expert attention.

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SHIPBUILDING & DRY DOCK COMPANY

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Nonferrous Metals

Aluminum prices advance following agreement by Alcoa to raise wages 15 cents an hour. Reynolds Metals completes financing which will speed up expansion plans

Nonferrous Metal Prices, Pages 106 & 107

CONSUMERS of nonferrous metals were heartened in one way but saddened in another by latest developments.

They anticipate increased supplies from domestic producers now that labor problems are being solved, but as an aftermath of wage settlements, they will have to pay higher prices for some of their raw materials.

Aluminum Co. of America, Pittsburgh, granted a wage increase averaging 15 cents an hour for 27,000 members of CIO United Steelworkers and the AFL Aluminum Workers.

Prices—Alcoa then increased prices 1 cent a pound to 22.50c on 99 per cent aluminum pig and 1.2 cents a pound to 24.40c on 99-plus per cent ingot, f.o.b. shipping point, effective Aug. 1. Prices for other grades of ingot also were increased 1.2 cents a pound or more.

Previous prices had been in effect since Jan. 13, 1955, when the company advanced 1 cent a pound for both pig and ingot aluminum.

Alcoa's new schedules advance prices of its sheet and plate an average of about 4.5 per cent. Price increases on other items vary from product to product. In addition to increases in base prices, small advances were made in quantity extras.

Freight Allowed—Under the new price schedules, Alcoa will allow full transportation on all shipments within the United States, subject to its right to select the agency of transportation. Previously, the company allowed freight refunds only on a carload rate basis, with customers buying in less than carload lots paying the freight difference.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., posted higher prices, effective Aug. 2. The increase is applicable to aluminum pig and ingot products, as well as all aluminum sheet products. The increase on 99-plus per cent aluminum pig is 1 cent a pound and on aluminum ingot ranges from ½-cent a pound to 1.3 cents per pound, depending upon chemical composition.

Kaiser's price increases for sheet vary by product, with an average increase of around 4 to 4.5 per cent. A company spokesman said that price increases for other mill products will be announced in the near future.

Supplies of aluminum have been tight for some time, with consumers unable to obtain all tonnages desired. The shortage is attributed to the steady expansion in its use.

Expansion Planned—All leading producers have enlarged their facilities to meet this steady growth in the aluminum market and have expressed determination to satisfy future needs. Following the announcement of a $235 million financing program by Reynolds Metals Co., officials said it will enable the company to accelerate its long-range expansion plans.

STEEL's Metal Price Averages for July, 1955

(Cents per lb)

Electrolytic Copper, deld. Connecticut	36.000
Lead, St. Louis	14.800
Prime Western Zinc, E. St. Louis, Ill.	12.250
Straits Tin, New York	97.045
Primary Aluminum Ingots, deld.	23.200
Magnesium, Freeport, Tex.	28.500
Nickel, f.o.b. refinery	64.500

Reynolds will proceed immediately with an expansion program which will increase primary aluminum production from 829 million lb to 1.1 billion lb a year. Largest single expenditure will be on a reduction plant in the Ohio river valley.

Reynolds Metals sold $155 million of mortgage bonds to institutional investors and obtained $80 million of unsecured bank borrowing. Proceeds of the financing, together with $10,517,000 of the company's cash, were used to refund all the firm's government and government-guaranteed mortgage and loan indebtedness. Reynolds Metals' domestic facilities are now privately financed.

Brass Mill Prices Rise

Mueller Brass Co., Port Huron, Mich., announced the following higher prices, effective Aug. 1: On free cutting brass rod, base price 41.08c a pound; seamless copper tube, 60.82c. The advance is due to the high-level cost of available secondary metal. The company also made the following changes in purchase prices for scrap: Clean copper sheet, 38.00c a pound; yellow brass rod turnings, 25.00c; yellow brass rod ends, 26.625c.

Bridgeport Brass Co., Bridgeport, Conn., advanced prices for its brass and copper mill products 4 cents a pound, except yellow brass rod which was increased 0.0257 cents, effective Aug. 1.

Copper Shortage Closes Mills

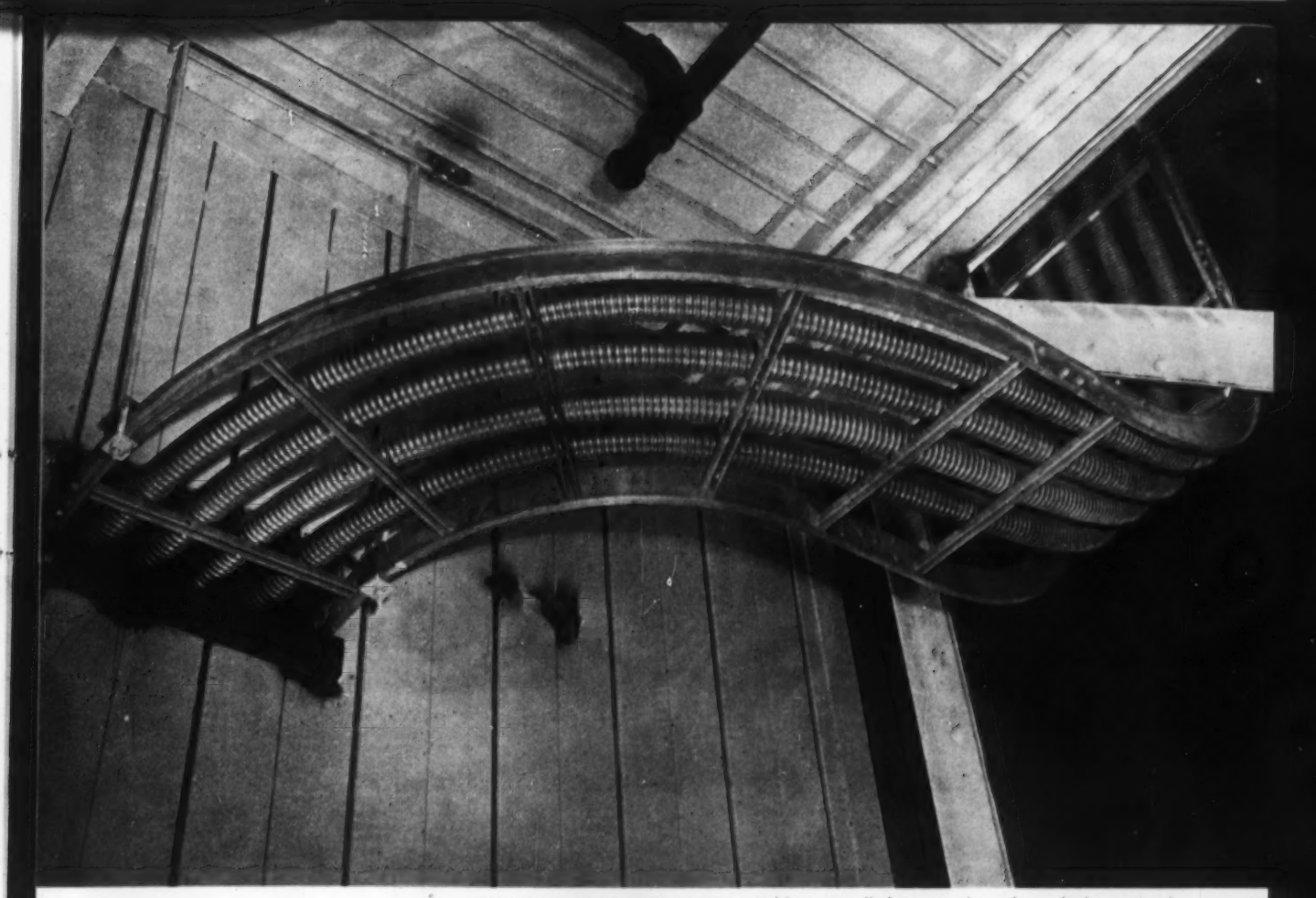
Brass producers say 65 per cent of the industry will have to close down because of the copper shortage. A month-old strike of the nation's copper mines and refiners has resulted in a loss of more than 60,000 tons of the metal.

Chase Brass & Copper Co., a subsidiary of Kennecott Copper Corp., closed its Waterbury, Conn., and Cleveland mills on July 29 until further notice. Sales offices and warehouses remain open with inventories available to take care of urgent requirements within the limited stocks on hand. The layoff will not affect its Waterbury fabricating plants unless brass stocks are depleted. Even after settlement of the strike at Kennecott's mines, there will be a delay in shipment of copper.

General Cable Corp., New York, resumed operations at all its plants on a limited scale after a two-week closedown caused by strikes in the copper producing industry. Copper in transit to its plants at the time of closedown and additional amounts it obtained at premium prices are beginning to arrive at rolling plants in sufficient volume to operate at least temporarily.

Settlement—Some hope of settlement of strikes within the industry is seen in the agreement signed by Phelps Dodge Corp. with the AFL unions at its mines and plants in Arizona, calling for a wage increase averaging slightly more than 15 cents an hour. However, no agreement has been reached so far with the independent Union of Mine, Mill & Smelter Workers which has struck the company's Morenci and Bisbee mines along with its Douglas smelter and the El Paso, Tex., copper refinery.

No copper can be diverted from the government's stockpile for private industry during the present shortage. It would require a revision of the law by Congress and that would take months. However, there are about 3500 tons of copper in the DPA stockpile which will be available for allocation to defense users after the strike is settled.



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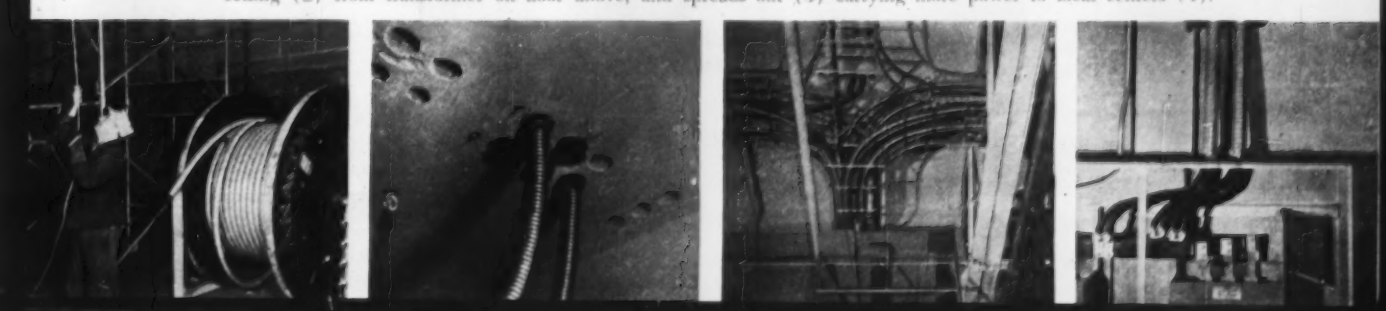


Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.2; No. 43, 5% Si, 26.00; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 27.80; No. 195, 4.5% Cu, 0.8% Si, 27.20; No. 214, 3.8% Mg, 27.7; No. 356, 7% Si, 0.3% Mg, 26.1.

Antimony: R.M.M. brand, 99.5%, 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 36.00 deld. Conn. Valley; 36.00 deld. Midwest; Lake, 36.00 deld; Fire refined, 35.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$100 nom, per troy oz.

Lead: Common, 14.80, chemical, 14.90, corroding, 14.90, St. Louis. New York basis, add 0.20.

Lithium: 99% +, cups or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.ob. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 28.50; notched ingot, 29.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingots; for Los Angeles, add 2.50 for both pig and ingot. Sticks 1.3 in. diameter, 49.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R, 34.00; alloy M, 36.00, 10,000 lb or more,, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $259-$261 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $80-$85 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $50-$55 per troy oz.

Selenium: 99.5%, $6-$7.25 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 97.625; prompt, 97.625.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.3% Fe max), $3.95, grade A-2 (0.5% Fe max), $3.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.35-$4.40 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99 + % hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 12.50; brass special, 12.75; intermediate, 13.00, E. St. Louis, freight allowed over 0.50 per pound. High grade, 13.85; special high grade, 14.00, deld. Diecasting alloy ingot No. 3, 16.50; Nos. 2 and 5, 17.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 29.25-31.25; No. 12 foundry alloy (No. 2 grade), 28.50; 5% silicon alloy, 0.60 Cu max, 30.25-30.75; 13 alloy, 0.60 Cu max, 30.50-30.75; 195 alloy, 30.25-30.75; 108 alloy, 29.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 29.50; grade 2, 28.50; grade 3, 27.50; grade 4, 27.00.

Brass Ingot: Red brass, No. 115, 39.75; tin bronze No. 225, 52.50; No. 245, 45.75; high-leaded tin bronze No. 305, 43.00; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 32.00; AZ91B, 32.00; AZ91C, 32.00; AZ92A, 32.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.74; rod, bar, wire, $1.71.

COPPER WIRE

Bare, soft, f.ob. eastern mills, 100,000-lb lots, 41.35; 30,000-lb lots, 41.48; l.c.l, 41.98. Weatherproof, 100,000-lb, 40.78; 30,000 lb, 41.03; l.c.l., 41.53. Magnet wire deld., 15,000 lb or more, 48.15; l.c.l., 48.90.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $20 per cwt; pipe, full coils, $20 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.00-20.50; plates, 19.00-

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	102	78	99
Strip, C.R.	102	87	125
Plate, H.R.	97	82	95
Rod, Shapes H.R.	87	69	93
Rod, Shapes C.R.	91	75	115
Seamless Tubes	122	108	153
Shot, Blocks		65	

ALUMINUM

Screw Machine Stock: 5000 lb and over.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	63.5	62.0	...	...
0.156-0.172	53.9	52.3	...	...
0.188	53.9	52.3	...	66.8
0.219-0.234	51.1	49.5	...	...
0.250-0.281	51.1	49.5	...	63.7
0.313	51.1	49.5	...	60.8
Cold-finished				
0.375-0.547	49.9	47.5	59.8	57.2
0.563-0.688	49.9	47.5	56.9	53.7
0.750-1.000	48.7	46.3	52.1	50.6
1.063	48.7	46.3	...	48.9
1.125-1.500	46.9	44.6	50.4	48.9
Rolled				
1.563	45.7	43.4	...	...
1.625-2.000	45.1	42.8	...	47.2
2.125-2.500	44.0	41.7	...	...
2.563-3.375	42.7	40.5	...	...

ALUMINUM

Sheets and Circles: 110 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circle†
0.249-0.136	37.5	42.3	...	...
0.135-0.096	38.0	43.2	...	...
0.095-0.077	38.7	44.2	38.1	41.3
0.076-0.061	39.3	45.1	38.3	41.5
0.060-0.048	39.9	45.6	36.7	42.0
0.047-0.038	40.4	46.5	37.2	42.4
0.037-0.030	40.8	47.0	37.6	43.1
0.029-0.024	41.4	47.5	37.9	43.6
0.023-0.019	42.2	49.0	38.8	44.5
0.018-0.017	43.0	...	39.4	45.4
0.016-0.015	43.9	...	40.2	46.6
0.014	44.9	...	41.2	47.9
0.013-0.012	46.1	...	41.9	48.9
0.011	47.1	...	43.1	50.5
0.010-0.0095	48.4	...	44.3	52.2
0.009-0.0085	49.7	...	45.8	54.3
0.008-0.0075	51.3	...	47.0	56.1
0.007	52.8	...	48.5	58.4
0.006	54.4	...	49.9	63.4

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.0
2024-T1*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. lengths.

ALUMINUM

Forging Stock: Round, Class 1, 47.80-37.30, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 53.60-41.00 in random lengths, 0.375-4 in. thick, widths 0.750-10 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20-ft lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$16.10	2	$ 49.55
1	25.35	4	136.65
1¼	34.30	6	244.90
1½	41.00	8	368.50

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; lb and over, f.o.b. mill.

Plate: Hot-rolled AZ31, 59.00, 30,000 lb or more, 0.250 in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 62.00, 30,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in., 72.20; 1 x 4 in., 67.00. Rod, 1 in., 69.00; 2 in., 66.50. Tubing, 1 in. OD x 0.065 in., 90.00. Angles, 1 x 1 x ⅛-in., 75.90; 2 x 2 x ¼-in., 70.00. Channels, 5 in., 70.90. I-beams, 5 in., 70.20.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 17.50-18.00; old sheets, 14.50-16.00; borings and turnings, 10.50-11.00; crankcases, 14.50-16.00; industrial castings, 14.50-16.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.76b	52.36c	....	54.82	32.000	32.000	31.250
Yellow Brass	46.27	37.22d	46.81	49.18	23.875	23.625	22.000
Red Brass, 85%	50.99	50.93	51.53	53.80	28.125	27.875	27.375
Low Brass, 80%	49.75	49.69	50.29	52.56	27.000	26.750	26.750
Naval Brass	49.99	44.30	57.05	53.15	22.125	21.875	21.375
Com. Bronze, 90%	52.78	52.72	53.32	55.34	29.250	29.000	28.500
Nickel Silver, 10%	60.20	62.53g	62.53	....	27.625	27.375	13.813
Phos. Bronze, A, 5%	73.03	73.53	73.53	74.71	32.250	32.000	31.000
Silicon Bronze	58.82	58.01	58.86	60.80e	31.125	30.875	30.125
Manganese Bronze	53.73	47.83	58.24	....	22.125	21.875	21.375
Muntz Metal	48.14	43.95	....	....	22.375	22.125	21.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: No. 1 heavy copper and wire, 35.00-35.50; No. 2 heavy copper and wire, 34.00-34.50; light copper, 32.00-32.50; No. 1 composition red brass, 28.00-28.50; No. 1 composition turnings, 26.50-27.50; yellow brass turnings, 17.50-18.00; new brass clippings, 22.00-23.00; light brass, 17.50-18.00; heavy yellow brass, 20.50-21.00; new brass rod ends, 20.50-21.00; auto radiators, unsweated, 22.00-22.50; cocks and faucets, 22.50-23.00; brass pipe, 23.50-24.00.

Lead: Heavy, 11.50-12.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.25; electrotype, 12.00-12.50; mixed babbitt, 14.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable *Fe*, less full deduction for *Fe*, 16.00-17.00.

Monel: Clippings, 38.50-42.00; old sheets, 34.00-36.00; turnings, 29.50; rods, 38.50-42.00.

Nickel: Sheets and clips, 80.00-90.00; rolled anodes, 80.00-90.00; turnings, 65.00-75.00; rod ends, 80.00-90.00.

Zinc: Old zinc, 5.00-5.50; new die-cast scrap, 5.00-5.50; old die-cast scrap, 3.50-3.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 21.50; 3003 clippings, 21.00-21.50; 6151 clippings, 20.50-21.50; 5052 clippings, 20.50-21.50; 2014 clippings, 20.50; 2017 clippings, 20.50; 2024 clippings, 20.50; mixed clippings, 20.50-21.00; old sheet, 17.50-18.00; old cast, 18.00; clean old cable (free of steel), 21.00-21.50; borings and turnings, 18.00-19.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 48.00; light scrap, 43.00.

Copper and Brass: No. 1 copper, 38.00; No. 2 copper, 36.50; light copper, 34.50-34.75; refinery brass (60% copper) per dry copper content, 33.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 copper, 38.00; No. 2 copper, 36.00; light copper, 34.00-34.25; No. 1 composition borings, 30.00-30.50; No. 1 composition solids, 30.50-31.00; heavy yellow brass solids, 22.00-23.50; yellow brass turnings, 21.50-22.00; radiators, 23.50-24.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 51.42, oval, 50.92, 5000-10,000 lb; electrodeposited, 45.78, 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.155 200-499 lb, $1.14, 500-999 lb, $1.135; 1000 lb or more,$1.13.

Zinc: Bar, 21.00; bar or flat top, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 76.80; 200 lb, 76.05; 300 lb, 75.80; 400-900 lb, 75.05; 1000 lb and over, 73.05; effective Mar. 24, 1955.

Copper Sulphate: Crystal, 100 lb, 21.50; 200 lb, 18.50; 300 lb, 17.50; 400 lb, 17.00; 500-1900 lb, 15.50; 2000-10,000 lb, 15.25; 10,000 lb and up, 15.15. Powder, add 0.5 to above prices. Effective Mar. 29, 1955.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.25. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 83.125; 16-oz bottle, 81.875; 80-oz bottle, 79.375; 100-oz bottle, 79.375; f.o.b. St. Louis, New York and Los Angeles. Effective Apr. 6, 1955.

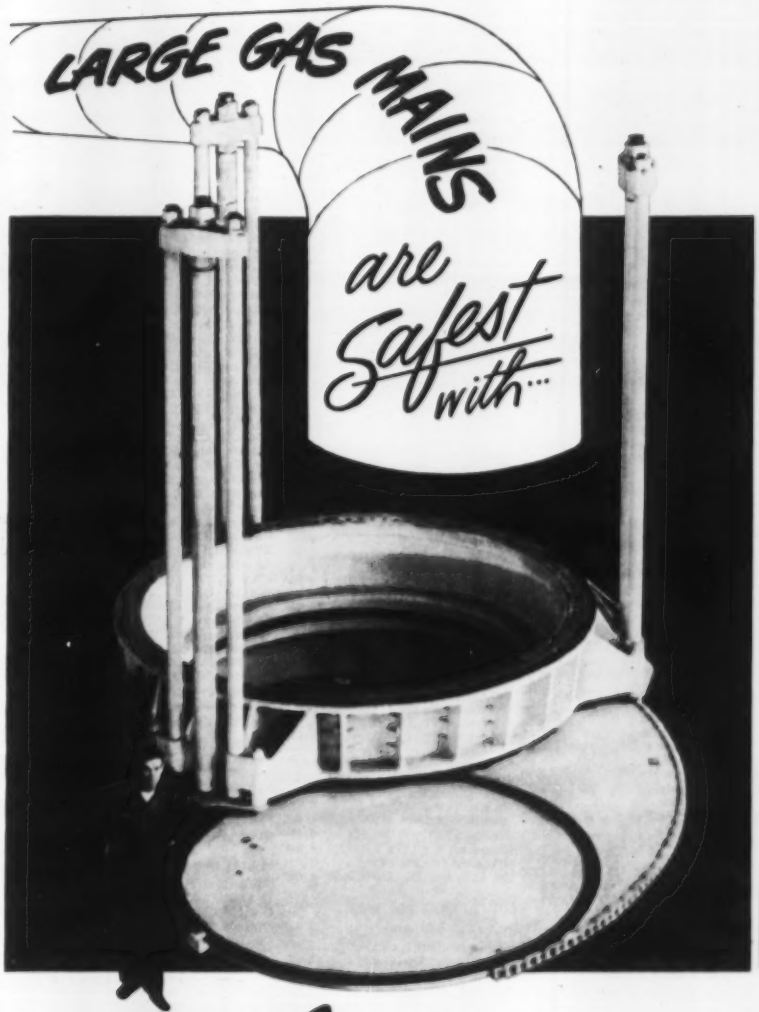
Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 73.00; 100-600 lb, 58.6; 700-1900 lb, 56.1; 2000-9900 lb, 54.4; 10,000 lb or more, 53.2.

Stannous Chloride (Anhydrous): Less than 50 lb, $1.594 50 lb, $1.254; 100-300 lb, $1.104; 400-900 lb, $1.08; 1000-1900 lb, $1.055; 2000-4900 lb, $1.019; 5000-19,900 lb, 95.8; 20,000 lb or more, 89.7.

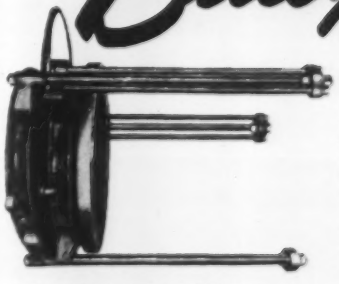
Stannous Sulphate: Less than 50 lb, $1.293; 50 lb, 99.30; 100-1900 lb, 97.30; 2000 lb or more, 95.3.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb 50 lb, 98.70; 100-1900 lb, 96.70; 2000 lb or and over, 52.30.



Bailey thermal expansion

GOGGLE VALVES



Made in sizes from 36" to 120" in diameter for horizontal or vertical gas mains.

One of nature's most dependable forces—the linear expansion and contraction of steel—frees and clamps the goggle plate of these valves. Steam applied to three sets of tubes causes expansion which frees the goggle plate for swinging to either open or closed position. When steam is removed, contraction of the tubes forms a tight, safe, leakproof seal. Can be operated by hand in case of steam failure.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY
1221 BANKSVILLE ROAD PITTSBURGH 16, PA.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 109. Key to footnotes, page 111.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $65.50

INGOTS, Alloy (NT)

Detroit R7 ..... $69.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 69.00
Munhall,Pa. U5 ..... 69.00

BILLETS, BLOOMS & SLABS Carbon, rerolling (NT)

Aliquippa,Pa. J5 ..... $68.50
Bessemer,Pa. U5 ..... 68.50
Bridgeport,Conn. N19 .. 69.00
Buffalo R2 ..... 68.50
Clairton,Pa. U5 ..... 68.50
Ensley,Ala. T2 ..... 68.50
Fairfield,Ala. T2 ..... 68.50
Fontana,Calif. K1 ..... 76.00
Gary,Ind. U5 ..... 68.50
Johnstown,Pa. B2 ..... 68.50
Lackawanna,N.Y. B2 .. 68.50
LoneStar,Tex. L6 ..... 70.00
Munhall,Pa. U5 ..... 68.50
Pittsburgh J5 ..... 68.50
So.Chicago,Ill. R2, U5.. 68.50
So.Duquesne,Pa. U5 .. 68.50
Youngstown R2 ..... 68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ..... $84.50
Bessemer,Pa. U5 ..... 84.50
Bridgeport,Conn. N19 .. 83.00
Buffalo R2 ..... 84.50
Canton,O. R2 ..... 86.50
Clairton,Pa. U5 ..... 84.50
Conshohocken,Pa. A3 .. 89.50
Ensley,Ala. T2 ..... 84.50
Fairfield,Ala. T2 ..... 84.50
Fontana,Calif. K1 ..... 92.00
Gary,Ind. U5 ..... 84.50
Geneva,Utah C11 ..... 84.50
Houston S5 ..... 89.50
Johnstown,Pa. B2 ..... 84.50
Lackawanna,N.Y. B2 .. 84.50
LosAngeles B3 ..... 94.00
Midland,Pa. C18 ..... 84.50
Munhall,Pa. U5 ..... 84.50
Pittsburgh J5 ..... 84.50
Seattle B3 ..... 98.00
So.Chicago R2,U5,W14 .. 84.50
So.Duquesne,Pa. U5 .. 84.50
So.SanFrancisco B3 ... 94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..... $96.00
Buffalo R2 ..... 96.00
Canton,O. R2, T7 ..... 96.00
Conshohocken,Pa. A3 .. 103.00
Detroit R7 ..... 96.00
Fontana,Calif. K1 ..... 115.00
Gary,Ind. U5 ..... 96.00
Houston S5 ..... 101.00
Ind.Harbor,Ind. Y1 ... 96.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 116.00
Massillon,O. R2 ..... 96.00
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
So.Chicago R2,U5,W14 96.00
So.Duquesne,Pa. U5 .. 96.00
Struthers,O. Y1 ..... 96.00
Warren,O. C17 ..... 96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $103.50
Canton,O. R2 ..... 103.50
Cleveland R2 ..... 103.50
Gary,Ind. U5 ..... 103.50
So.Chicago R2, W14 .. 103.50
So.Duquesne,Pa. U5 .. 103.50

SKELP

Aliquippa,Pa. J5 ..... 4.325
LoneStar,Tex. L6 ..... 4.30
Munhall,Pa. U5 ..... 4.225
SparrowsPoint,Md. B2 .. 4.225
Warren,O. R2 ..... 4.225
Youngstown R2, U5 ... 4.225

WIRE RODS

AlabamaCity,Ala. R2 .. 5.025
Aliquippa,Pa. J5 ..... 5.025
Alton,Ill. L1 ..... 5.20
Buffalo B11, W12 ..... 5.025
Cleveland A7 ..... 5.025
Donora,Pa. A7 ..... 5.025
Fairfield,Ala. T2 ..... 5.025
Houston S5 ..... 5.275
IndianaHarbor,Ind. Y1 .. 5.025
Johnstown,Pa. B2 ..... 5.025
Joliet,Ill. A7 ..... 5.025
KansasCity,Mo. S5 ..... 5.275
Kokomo,Ind. C16 ..... 5.125
LosAngeles B3 ..... 5.825
Minnequa,Colo. C10 .... 5.275
Monessen,Pa. P7 ..... 4.675
No.Tonawanda,N.Y. B11 4.675
Pittsburg,Calif. C11 .... 5.675
Portsmouth P12 ..... 5.025
Roebling,N.J. R5 ..... 5.125
So.Chicago,Ill. R2 ..... 5.025
SparrowsPoint,Md. B2 .. 5.125
Sterling,Ill.(1) N15 .... 5.025
Sterling,Ill. N15 ..... 5.125
Struthers,O. Y1 ..... 5.025
Worcester,Mass. A7 .... 5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 4.60
Aliquippa,Pa. J5 ..... 4.60
Bessemer,Ala. T2 ..... 4.60
Bethlehem,Pa. B2 ..... 4.65
Birmingham C15 ..... 4.60
Clairton,Pa. U5 ..... 4.60
Fairfield,Ala. T2 ..... 4.60
Fontana,Calif. K1 ..... 5.25
Gary,Ind. U5 ..... 4.60
Geneva,Utah C11 ..... 4.60
Houston S5 ..... 4.70
Ind.Harbor,Ind. I-2 .... 4.60
Johnstown,Pa. B2 ..... 4.65
KansasCity,Mo. S5 ..... 4.70
Lackawanna,N.Y. B2 .... 4.65
LosAngeles B3 ..... 5.30
Minnequa,Colo. C10 .... 4.90
Munhall,Pa. U5 ..... 4.60
Niles,Calif. P1 ..... 4.90
Portland,Oreg. O4 ..... 5.35
Phoenixville,Pa. P4 ..... 5.15
Seattle B3 ..... 5.35
So.Chicago U5, W14 .... 4.60
So.SanFrancisco B3 .... 5.25
Torrance,Calif. C11 .... 5.30
Weirton,W.Va. W6 ..... 4.60

Wide Flange

Bethlehem,Pa. B2 ..... 4.65
Clairton,Pa. U5 ..... 4.60
Fontana,Calif. K1 ..... 5.40
Lackawanna,N.Y. B2 .... 4.65
Munhall,Pa. U5 ..... 4.60
Phoenixville,Pa. P4 ..... 5.15
So.Chicago,Ill. U5 ..... 4.60

Alloy Std. Shapes

Clairton,Pa. U5 ..... 5.65
Fontana,Calif. K1 ..... 7.30
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.75
Munhall,Pa. U5 ..... 5.65
So.Chicago,Ill. U5 ..... 5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 6.75
Bessemer,Ala., T2 ..... 6.75
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.75
Fairfield,Ala. T2 ..... 6.75
Fontana,Calif. K1 ..... 7.40
Gary,Ind. U5 ..... 6.75
Geneva,Utah C11 ..... 6.75
Houston S5 ..... 6.85
Ind.Harbor,Ind. I-2, Y1 .. 6.75
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 ..... 6.85
Lackawanna,N.Y. B2 .... 6.80
LosAngeles B3 ..... 7.45
Munhall,Pa. U5 ..... 6.75
Seattle B3 ..... 7.50
So.Chicago,Ill. U5, W14 .. 6.75
So.SanFrancisco B3 .... 7.40
Struthers,O. Y1 ..... 6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 6.80
Lackawanna,N.Y. B2 .... 6.80
Munhall,Pa. U5 ..... 6.75
So.Chicago,Ill. U5 ..... 6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 4.65
Lackawanna,N.Y. B2 .... 4.65
Munhall,Pa. U5 ..... 4.60
So.Chicago,Ill. U5 ..... 4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 .... 5.45
Lackawanna,N.Y. B2 .... 5.45
Munhall,Pa. U5 ..... 5.45
So.Chicago,Ill. U5 ..... 5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.50
Aliquippa,Pa. J5 ..... 4.50
Ashland,Ky.(15) A10 .... 4.50
Bessemer,Ala. T2 ..... 4.50
Bridgeport,Conn. N19 .. 4.75
Buffalo R2 ..... 4.50
Clairton,Pa. U5 ..... 4.50
Claymont,Del. C22 ..... 4.50
Cleveland J5, R2 ..... 4.60
Coatesville,Pa. L7 ..... 4.50
Conshohocken,Pa. A3 .... 4.50
Detroit M1 ..... 4.60
Ecorse,Mich. G5 ..... 4.60
Fairfield,Ala. T2 ..... 4.50
Fontana,Calif.(30) K1 .. 5.15
Gary,Ind. U5 ..... 4.50
Geneva,Utah C11 ..... 4.50
GraniteCity,Ill. G4 ..... 4.70
Harrisburg,Pa. C5 ..... 5.10
Houston S5 ..... 4.60
Ind.Harbor,Ind. I-2, Y1 .. 4.50
Johnstown,Pa. B2 ..... 4.50
Lackawanna,N.Y. B2 .... 4.50
LoneStar,Tex. L6 ..... 4.55
Mansfield,O. E6 ..... 4.50
Minnequa,Colo. C10 .... 5.35
Munhall,Pa. U5 ..... 4.50
Newport,Ky. N9 ..... 4.50
Pittsburgh J5 ..... 4.50
Riverdale,Ill. A1 ..... 4.50
Seattle B3 ..... 5.40
Sharon,Pa. S3 ..... 4.50
So.Chicago R2, U5, W14 .. 4.50
SparrowsPoint,Md. B2 .. 4.50
Steubenville,O. W10 .... 4.50
Warren,O. R2 ..... 4.50
Weirton,W.Va. W6 ..... 4.50
Youngstown R2, U5, Y1 .. 4.50

PLATES, Carbon Abras. Resist.

Fontana,Calif. K1 ..... 6.30
Geneva,Utah C11 ..... 5.65
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 .. 5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 10.40

PLATES, High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.725
Bessemer,Ala. T2 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Cleveland J5, R2 ..... 6.725
Coatesville,Pa. L7 ..... 6.725
Conshohocken,Pa. A3 .. 6.725
Ecorse,Mich. G5 ..... 6.825
Fairfield,Ala. T2 ..... 6.725
Fontana,Calif.(30) K1 .. 7.375
Gary,Ind. U5 ..... 6.725
Geneva,Utah C11 ..... 6.725
Houston S5 ..... 6.825
Ind.Harbor,Ind. I-2, Y1 .. 6.725
Johnstown,Pa. B2 ..... 6.725
LosAngeles B3 ..... 7.625
Munhall,Pa. U5 ..... 6.725
Pittsburgh J5 ..... 6.725
Seattle B3 ..... 7.625
Sharon,Pa. S3 ..... 6.725
So.Chicago,Ill. U5, W14 .. 6.725
SparrowsPoint,Md. B2 .. 6.725
Youngstown U5, Y1 .... 6.725

PLATES, Alloy

Bridgeport,Conn. N19 .. 6.55
Claymont,Del. C22 ..... 6.30
Coatesville,Pa. L7 ..... 6.30
Fontana,Calif. K1 ..... 6.95
Gary,Ind. U5 ..... 6.30
Houston S5 ..... 6.40
Ind.Harbor,Ind. Y1 .... 6.30
Johnstown,Pa. B2 ..... 6.30
Munhall,Pa. U5 ..... 6.30
Newport,Ky. N9 ..... 6.30
Seattle B3 ..... 7.20
Sharon,Pa. S3 ..... 6.30
So.Chicago,Ill. U5, W14 .. 6.30
SparrowsPoint,Md. B2 .. 6.30
Youngstown Y1 ..... 6.30

FLOOR PLATES

Cleveland J5 ..... 5.575
Conshohocken,Pa. A3 .. 5.575
Harrisburg,Pa. C5 .... 5.575
Ind.Harbor,Ind. I-2 .... 5.575
Munhall,Pa. U5 ..... 5.575
So.Chicago,Ill. U5 ..... 5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10.. 4.75
Ashland l.c.l. (15) A10.. 5.25
Cleveland c.l. R2 ..... 5.10
Warren,O. c.l. R2 ..... 5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 ..... 4.65
Aliquippa,Pa. J5 ..... 4.65
Alton,Ill. L1 ..... 4.85
Atlanta A11 ..... 4.85
Bessemer,Ala. T2 ..... 4.65
Birmingham C15 ..... 4.65
Bridgeport,Conn. N19 .. 4.80
Buffalo R2 ..... 4.65
Canton,O. R2 ..... 4.75
Clairton,Pa. U5 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90
Ind.Harbor,Ind. I-2, Y1 .. 4.65
Johnstown,Pa. B2 ..... 4.65
Joliet,Ill. P22 ..... 4.65
KansasCity,Mo. S5 ..... 4.90
Lackawanna,N.Y. B2 .... 4.65
LosAngeles B3 ..... 5.35
Massillon,O. R2 ..... 4.75
Midland,Pa. C18 ..... 4.65
Milton,Pa. M18 ..... 4.65
Minnequa,Colo. C10 .... 5.10
Niles,Calif. P1 ..... 5.00
N.Tonawanda,N.Y. B11.. 4.30
Pittsburg,Calif. C11 .... 5.35
Pittsburgh J5 ..... 4.65
Portland,Oreg. O4 ..... 5.40
Seattle B3, N14 ..... 5.40
So.Chicago R2, U5, W14 .. 4.65
So.Duquesne,Pa. U5 .... 4.65
So.SanFran.,Calif. B3 .. 5.40
Sterling,Ill.(1) N15 .... 4.65
Sterling,Ill. N15 ..... 4.75
Struthers,O. Y1 ..... 4.65
Torrance,Calif. C11 .... 5.35
Warren,O. R2 ..... 4.65
Weirton,W.Va. W6 ..... 4.65
Youngstown R2, U5 .... 4.65

BARS, H.R. Loaded

Warren,O. C17 ..... 6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ..... 5.575
Bridgeport,Conn. N19 .. 5.725
Buffalo R2 ..... 5.575
Canton,O. R2, T7 ..... 5.575
Clairton,Pa. U5 ..... 5.575
Detroit R7 ..... 5.575
Ecorse,Mich. G5 ..... 5.675
Fontana,Calif. K1 ..... 6.625
FairlessHills,Pa. U5 .... 5.725
Gary,Ind. U5 ..... 5.575
Houston S5 ..... 5.825
Ind.Harbor,Ind. I-2, Y1 .. 5.575
Johnstown,Pa. B2 ..... 5.575
KansasCity,Mo. S5 ..... 5.825
Lackawanna,N.Y. B2 .... 5.575
LosAngeles B3 ..... 6.625
Massillon,O. R2 ..... 5.575
Midland,Pa. C18 ..... 5.575
So.Chicago R2, U5, W14 .. 5.575
So.Duquesne,Pa. U5 .... 5.575
Struthers,O. Y1 ..... 5.575
Warren,O. C17 ..... 5.575
Youngstown U5 ..... 5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 6.80
Bessemer,Ala. T2 ..... 6.80
Bethlehem,Pa. B2 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Cleveland R2 ..... 6.80
Ecorse,Mich. G5 ..... 6.90
Fairfield,Ala. T2 ..... 6.80
Fontana,Calif. K1 ..... 7.50
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
Ind.Harb.,Ind. I-2, Y1.. 6.80
Johnstown,Pa. B2 ..... 6.80
KansasCity,Mo. S5 ..... 7.05
Lackawanna,N.Y. B2 .... 6.80
LosAngeles B3 ..... 7.50
Pittsburgh J5 ..... 6.80
Seattle B3 ..... 7.55
So.Chicago W14 ..... 6.80
So.Duquesne,Pa. U5 .... 6.80
So.SanFrancisco B3 .... 7.55
Struthers,O. Y1 ..... 6.80
Warren,O. R2 ..... 6.80
Youngstown U5 ..... 6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 ..... 4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 4.65
Atlanta A11 ..... 4.85
Fontana,Calif. K1 ..... 5.35
Niles,Calif. P1 ..... 5.00
Pittsburgh J5 ..... 4.30
Portland,Oreg. O4 ..... 5.05
SanFrancisco S7 ..... 5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5 ..... 5.65
Gary,Ind. U5 ..... 5.65
Houston S5 ..... 5.90
KansasCity,Mo. S5 ..... 5.90
Youngstown U5 ..... 5.65

BARS, C.F. Loaded

Ambridge,Pa. W18 .... 7.525
Camden,N.J. P13 ..... 8.50
Chicago W18 ..... 7.525
Cleveland C20 ..... 7.85
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 7.70
SpringCity,Pa. K3 .... 8.50
Warren,O. C17 ..... 8.325

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .... 5.90
BeaverFalls,Pa. M12, R2.. 5.90
Buffalo B5 ..... 5.95
Camden,N.J. P13 ..... 6.35
Carnegie,Pa. C12 ..... 5.90
Chicago W18 ..... 5.90
Cleveland A7, C20 .... 5.90
Detroit R7 ..... 5.90
Detroit B5, P17 ..... 6.10
Donora,Pa. A7 ..... 5.90
Elyria,O. W8 ..... 5.90
FranklinPark,Ill. N5 ... 5.90
Gary,Ind. R2 ..... 5.90
GreenBay,Wis. F7 ..... 5.90
Hammond,Ind. L2, M13.. 5.90
Hartford,Conn. R2 .... 6.40
Harvey,Ill. B5 ..... 5.90
LosAngeles R2, S30 .... 7.35
Mansfield,Mass. B5 .... 6.45
Massillon,O. R2, R8 .... 5.90
Midland,Pa. C18 ..... 5.90
Monaca,Pa. S17 ..... 5.90
Newark,N.J. W18 ..... 6.35
NewCastle,Pa.(17) B4 .. 5.90
Pittsburgh J5 ..... 5.90
Plymouth,Mich. P5 .... 6.15
Putnam,Conn. W18 .... 6.45
Readville,Mass. C14 .... 6.45
So.Chicago,Ill. W14 .... 5.90
SpringCity,Pa. K3 ..... 6.35
Struthers,O. Y1 ..... 5.90
Waukegan,Ill. A7 ..... 5.90
Worcester,Mass. W19 .... 6.35
Youngstown F3, Y1 .... 5.90

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ... 5.15

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 .... 7.425
BeaverFalls,Pa. M12,R2 7.425
Bethlehem,Pa. B2 ..... 7.425
Buffalo B5 ..... 7.425
Camden,N.J. P13 ..... 7.60
Canton,O. T7 ..... 7.425
Carnegie,Pa. C12 ..... 7.425
Chicago W18 ..... 7.425
Cleveland A7, C20 .... 7.425
Detroit R7 ..... 7.425
Detroit B5, P17 ..... 7.625
Donora,Pa. A7 ..... 7.425
Elyria,O. W8 ..... 7.425
Gary,Ind. R2 ..... 7.425
GreenBay,Wis. F7 ..... 7.425
Hammond,Ind. L2, M13.. 7.425
Hartford,Conn. R2 .... 7.725
Harvey,Ill. B5 ..... 7.425
Lackawanna,N.Y. B2 .. 7.425
LosAngeles S30 ..... 9.10
Mansfield,Mass. B5 .... 7.725
Massillon,O. R2, R8 .... 7.425
Midland,Pa. C18 ..... 7.425
Monaca,Pa. S17 ..... 7.425
Newark,N.J. W18 ..... 7.60
Plymouth,Mich. P5 .... 7.625
So.Chicago W14 ..... 7.425
SpringCity,Pa. K3 ..... 7.60
Struthers,O. Y1 ..... 7.425
Warren,O. C17 ..... 7.425
Waukegan,Ill. A7 ..... 7.425
Worcester,Mass. A7 .... 7.725
Youngstown F3, Y1 .... 7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 4.65
Atlanta A11 ..... 4.85
Birmingham C15 ..... 4.65
Buffalo R2 ..... 4.65
Cleveland R2 ..... 4.65
Ecorse,Mich. G5 ..... 4.75
Emeryville,Calif. J7 .... 5.40
Fairfield,Ala. T2 ..... 4.65
FairlessHills,Pa. U5 .... 4.80
Fontana,Calif. K1 ..... 5.35
Ft. Worth,Tex.(42) T4 .. 5.10
Gary,Ind. U5 ..... 4.65
Houston S5 ..... 4.90

Ind.Harbor,Ind. I-2, Y1 .4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ...4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
So.Chicago R2 .....4.65
So.Duquesne,Pa. U5 ....4.65
So.SanFrancisco B3 ....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5, Y1 ..4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ...6.17
Marion,O. P11 .....5.90
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ¼-1" B2 ..6.15
Williamsport,Pa. S19 ...6.00

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2..4.55
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..4.95
Franklin,Pa.(3) F5 .....4.55
Franklin,Pa.(4) F5 .....4.65
Marion,O.(3) P11 .....4.50
Moline,Ill.(3) R2 .....4.65
Tonawanda(3) B12 .....4.50
Tonawanda(4) B12 .....4.65
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt) B14 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ...4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
FairlessHills,Pa. U5 ...4.375
Fontana,Calif. K1 .....5.075
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2, Y1.4.325
Kokomo,Ind. C16 .....4.425
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. N12 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
Sharon,Pa. S3 .....4.325
So.Chicago,Ill. W14 ...4.325
SparrowsPoint,Md. B2..4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Kokomo,Ind. C16 .....5.475
Niles,O. N12 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ....6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
FairlessHills,Pa. U5 ...6.425
Fontana,Calif. K1 .....7.125
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
So.Chicago,Ill. U5 ....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Weirton,W.Va. W6 ....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Cleveland R2 .....4.925
Ind.Harbor,Ind. I-2 ...4.575
Warren,O. R2 .....4.925

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
FairlessHills,Pa. U5 ...5.375
Follansbee,W.Va. B20..5.325
Fontana,Calif. K1 .....6.425
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
FairlessHills,Pa. U5 ...7.925
Fontana,Calif. K1 .....8.975
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ...7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.50	7.10
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary, Ind. U5 .....5.95
MartinsFry,O. W10 .....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Delphos,O. N16 .....6.60‡
Dravosburg,Pa. U5 ....5.85†
Dover,O. R1 .....5.85‡
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ..5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport, Ky. N9 .....5.85‡
Niles,O. N12 .....6.85‡
Pittsburg,Calif. C11 ...6.60*
SparrowsPt.,Md. B2 ...5.85†
Steubenville,O. W10 ...5.85‡
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ....5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .....6.575

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25
Niles,O. N12 .....7.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 .....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 .....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 ....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 .....5.90
Niles,O. N12 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. B20 ..7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 .....6.25
Niles,O. N12 .....6.25
Weirton,W.Va. W6 .....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....6.65

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A6 American Shim Steel Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.
B30 Berkman Co., Louis

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Products
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ...4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 ....4.325
Birmingham C15 .....4.325
Bridgeport,Conn. N19 ..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1 4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(25) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ...5.425
NewBritain(10) S15 ..4.325
N.Tonawanda,N.Y. B11.4.06
Pittsburg,Calif. C11 ...5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
SanFrancisco 87 .....5.05
Seattle (25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
So.Chicago,Ill. W14 ..4.325
So.SanFrancisco(25) B3 5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ..5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ...4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ...7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
So.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....6.425
Conshohocken,Pa. A3 ..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1 6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
So.SanFrancisco(25) B3 7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ...4.675
Warren,O. R2 .....4.925

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 .....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Cleveland J5 .....6.45
Cleveland A7 .....6.25
Conshohocken,Pa. A3 ...6.30
Dearborn,Mich. D3 .....6.35
Detroit D2, M1, P20 ....6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. B20 ..6.25
Fontana,Calif. K1 .....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 .....6.45
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ....6.25
LosAngeles C1 .....8.50
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ....6.25
NewCastle,Pa. B4, E5...6.25
NewHaven,Conn. A7 ....7.00
NewHaven,Conn. D2 ....6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 .....6.90
Pawtucket,R.I. N8 .....6.80
Pittsburgh J5 .....6.45
Portsmouth,O. P12 .....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 .....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 .....6.25
Trenton,N.J.(31) R5 .....7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 .....6.25
Weirton,W.Va. W6 .....6.25
Worcester,Mass. A7 ....7.10
Youngstown Y1 .....6.45
Youngstown C8 .....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 .....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 .....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ....13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.30
Dearborn,Mich. D3 .....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20
Ind.Harbor,Ind. Y1 ....9.30

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	....
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	7.10	9.05	10.60	....	....
Detroit D2	7.10	9.05	10.60	12.75	....
Dover,O. G6	7.00	8.95	10.50	12.65	15.35
Follansbee,W.Va. B20	7.40	8.95	10.50**	....	....
FranklinPark,Ill. T6	7.10	8.95	10.50	12.65	15.35
Harrison,N.J. C18	....	...	10.80	12.95	15.65
Indianapolis C8	7.15	9.10	10.50	12.65	15.35
NewBritain,Conn.(10) S15	7.00	8.95	10.50	12.65	15.35
NewCastle,Pa. B4	7.00	8.95	10.50	12.65	....
NewCastle,Pa. E5	7.00	8.95	10.50	12.65	....
NewHaven,Conn. D2	7.45	9.25	10.80	12.95	....
NewKensington,Pa. A6	7.00	8.95	10.50	....	....
NewYork W3	...	9.25	10.80	12.95	15.65
Pawtucket,R.I. N8	7.55	9.25	10.80	12.95	15.35
Riverdale,Ill. A1	7.10	8.95	10.50	12.65	15.35
Rome,N.Y.(32) R6	7.00	8.95	10.50	12.65	15.35
Sharon,Pa. S3	7.00	8.95	10.50	12.65	15.35
Trenton,N.J. R5	....	9.25	10.80	12.95	15.65
Wallingford,Conn. W2	7.45	9.25	10.80	12.95	15.65
Warren,O. T5	7.00	8.95	10.50	12.65	15.35
Weirton,W.Va. W6	7.00	8.95	10.50	12.65	15.35
Worcester,Mass. T6	7.55	9.25	10.80	12.95	15.65
Worcester,Mass. A7	7.85	9.25	10.80	12.95	15.65
Youngstown C8	7.00	8.95	10.50	12.65	15.35

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	....	...	14.40	17.60	....
Buffalo W12	....	...	14.40	....	....
FranklinPark,Ill. T6	....	...	14.90	18.10	21.50
Harrison,N.J. C18	....	...	14.40	17.60	21.00
NewYork W3	....	...	14.40	17.60	21.00
Trenton,N.J. R5	....	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	....	...	14.40	17.60	21.00
Worcester,Mass. W12	....	...	14.40	....	....
Youngstown C8	....	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	9.95	10.95	11.85
Brackenridge,Pa. A4	....	....	*9.95*	*10.95*	*11.85*
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	....	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	....	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	*10.70*	*11.70*	*12.60*	
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	....	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	....	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	*12.80*	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80‡	13.35‡	13.85‡	14.85‡

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	*15.85*	*17.45*	*17.95*	*13.55‡*
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Dravosburg,Pa. U5	7.50	7.75	8.15
Fairfield,Ala. T2	7.60	7.85	8.25
FairlessHills,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.60	7.75	8.15

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	*6.675*	*6.875*	*7.075*

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Dravosburg,Pa. U5	8.80	9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Pitts.Calif. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)

Aliquippa,Pa. J5 .....$6.60
Dravosburg,Pa. U5 .....6.60
Fairfield,Ala. T2 .....6.70
FairlessHills,Pa. U5 ....6.70
Gary,Ind. U5 .....6.60
GraniteCity,Ill. G4 .....6.70
Ind.Harbor,Ind. I-2, Y1.6.60
Niles,O. R2 .....6.60
Pittsburg,Calif. C11 ....7.35
SparrowsPoint,Md. B2 ..6.70
Warren,O. R2 .....6.60
Weirton,W.Va. W6 .....6.60
Yorkville,O. W10 .....6.60

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 .....6.65
Gary,Ind. U5 .....6.65
GraniteCity,Ill. G4 .....6.75
Ind.Harbor,Ind. Y1 ....6.65
Yorkville,O. W10 .....6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5 ....$7.85
Gary,Ind. U5 .....7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10 .....$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5 .....9.85

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.25
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville,Ill. K4 .....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville,Ind. M8..6.35
Donora,Pa. A7 .....6.25
Duluth,Minn. A7 .....6.25
Fairfield,Ala. T2 .....6.25
Fostoria,O.(24) S1 .....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ...6.77
Johnstown,Pa. B2 .....6.25
Joliet,Ill. A7 .....6.25
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 .....6.50
Monessen,Pa. P7 .....5.75
Newark 6-8 ga. I-1 ....6.90
No.Tonawanda B11 .....5.75
Palmer,Mass. W12 .....6.55
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 .....6.25
Rankin,Pa. A7 .....6.25
So.Chicago,Ill. R2 .....6.25
So.SanFrancisco C10 ..7.20
SparrowsPoint,Md. B2 ..6.35
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. A7 .....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 ....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 .....8.20
Pittsburg,Calif. C11 ...8.85
Portsmouth,O. P12 .....7.90
Roebling,N.J. R5 .....8.20
So.Chicago,Ill. R2 .....7.90
So.SanFrancisco C10 ..8.85
SparrowsPt.,Md. B2 ....8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester J4 .....8.20
Worcester A7, T6, W12..8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....7.775
Buffalo W12 .....7.60
Cleveland A7 .....7.60
Donora,Pa. A7 .....7.60
Duluth,Minn. A7 .....7.60
Johnstown,Pa. B2 .....7.60
KansasCity,Mo. S5 ....7.50
LosAngeles B3 .....8.55
Minnequa,Colo. C10 ....7.775
Monessen,Pa. P16 .....7.60
NewHaven,Conn. A7 ..7.90
Palmer,Mass. W12 .....7.90
Pittsburg,Calif. C11 ....8.55
Portsmouth,O. P12 .....7.60
Roebling,N.J. R5 .....7.90
So.Chicago,Ill. R2 .....7.60
So.SanFrancisco C10 ...8.55
SparrowsPoint,Md. B2 ..7.70
Struthers,O. Y1 .....7.60
Trenton,N.J. A7 .....7.90
Waukegan,Ill. A7 .....7.60
Worcester,Mass. A7 .....7.90

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1 .....12.725
Bartonville,Ill. K4 .....12.65
Buffalo W12 .....12.55
Chicago W13 .....12.55
Cleveland A7 .....12.55
Crawfordsville,Ind. M8.12.65
Fostoria,O. S1 .....12.55
Jacksonville,Fla. M8 ...13.08
Johnstown,Pa. B2 .....12.55
Minnequa,Colo. C10 ....12.30
Monessen,Pa. P16 .....12.55
Muncie,Ind. I-7 .....12.75
Palmer,Mass. W12 .....12.85
Roebling,N.J. R5 .....12.85
So.SanFrancisco C10 ..12.90
Waukegan,Ill. A7 .....12.55
Worcester,Mass. T6 ....12.85
Worcester,Mass. A7 ....12.80

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4 .....10.70
Buffalo W12 .....10.70
Johnstown,Pa. B2.....10.70
Minnequa,Colo. C10 ....10.825
Monessen,Pa. P16 .....10.70
Muncie,Ind. I-7 .....10.90
Portsmouth,O. P12 .....10.70
Roebling,N.J. R5 .....11.00
SparrowsPt.,Md. B2 ....10.80

ROPE WIRE	(A)
Bartonville,Ill. K4	10.55
Buffalo W12	9.75
Fostoria,O.(23) S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.55
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	*10.85*

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Alton,Ill. L1	14.225
Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.00
Baltimore T6	9.30
Buffalo W12	9.00
Cleveland A7	9.00
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.00
Fostoria,O. S1	9.00
FranklinPark,Ill. T6	9.10
Kokomo,Ind. C16	9.00
Massillon,O. R8	*9.00*
Milwaukee C23	9.20
Monessen,Pa. P16	9.00
Pawtucket,R.I. N8	9.30
Riverdale,Ill. A1	9.10
Rome,N.Y. R6	9.00
Trenton,N.J. R5	9.30
Worcester A7, T6, W12	9.30

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	137
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
So.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	137
Pittsburg,Calif. C11	171
Rankin,Pa. A2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	*$9.35*
Bartonville,Ill. K4	9.45
Buffalo W12	9.35
Crawfordsville,Ind. M8	9.46
Donora,Pa. A7	9.35
Duluth,Minn. A7	9.35
Johnstown,Pa. B2	9.35
Joliet,Ill. A7	9.35
Kokomo,Ind. C16	9.45
LosAngeles B3	10.14
Minnequa,Colo. C10	9.60
So.Chicago,Ill. R2	*9.25*
SparrowsPt. B2	9.45
Sterling,Ill. N15	9.35
Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	*$9.65*
Bartonville,Ill. K4	9.75
Buffalo W12	9.60
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.65
Duluth,Minn. A7	9.65
Johnstown,Pa. B2	9.65
Joliet,Ill. A7	9.65
Kokomo,Ind. C16	9.75
LosAngeles B3	10.45
Minnequa,Colo. C10	9.90
So.Chicago,Ill. R2	*9.65*
SparrowsPt. B2	9.75
Sterling,Ill. N15	9.65
Coil No. 6500 Interim	
AlabamaCity,Ala. R2	*$9.70*
Bartonville,Ill. K4	9.80
Buffalo W12	9.70
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.70
Duluth,Minn. A7	9.70
Johnstown,Pa. B2	9.70
Joliet,Ill. A7	9.70
Kokomo,Ind. C16	9.80
LosAngeles B3	11.05
Minnequa,Colo. C10	9.95
So.Chicago,Ill. R2	*9.70*
SparrowsPt. B2	9.80
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180†
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180†
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	162
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
So.Chicago,Ill. R2	*175**
So.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179*

WOVEN Fence, 9-15 Ga.

	Col.
Ala.City,Ala. R2	*162**
Ala.City, 17 ga. R2	241**
Ala.City, 18 ga. R2	251**
Aliqppa,Pa.9-14½ga. J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167†
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167†
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	149
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
So.Chicago,Ill. R2	*162**
Sterling,Ill.(1) N15	166*

	An'ld Stone	Galv. Stone
WIRE (16 Gage)		
Ala.City R2	*14.50*	*16.05***
Bartonville K4	14.60	16.50
Buffalo W12	14.50	
Cleveland A7	14.50	
Crawf'dsville M8	14.60	16.50
Fostoria,O. S1	14.60	16.15†
Johnstown B2	14.15	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
So.Chicago R2	*14.50*	*16.05***
SparrowsPt. B2	14.60	16.50*
Sterling(1)	N15 14.50	16.40
Waukegan A7	14.50	16.05†
Worcester A7	14.80	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.40	7.80**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.50	8.075
Bartonville(48) K4	7.50	8.075
Buffalo W12	7.40	8.80†
Cleveland A7	7.40	
Crawfordsville M8	7.50	8.075
Donora,Pa. A7	7.40	7.80†
Duluth,Minn. A7	7.40	7.80†
Fairfield T2	7.40	7.80†
Houston,Tex. S5	7.65	8.05†
Jacks'ville,Fla. M8	7.90	8.475
Johnstown B2(48)	7.40	7.975*
Joliet,Ill. A7	7.40	7.80†
KansasCity,Mo. S5	7.65	8.06†
Kokomo C16	7.50	7.90†
LosAngeles B3	8.35	8.925†
Minnequa C10	7.65	8.05**
Monessen P7 (48)	6.90	7.45
Palmer,Mass. W12	7.70	8.10†
Pitts.,Calif. C11	8.30	8.75†
Portsmouth,O. P12	7.40	
Rankin A7	7.40	7.80†
So.Chicago R2	7.65	8.05**
So.S.Fran. C10	8.35	8.75**
Spar'waPt.B2(48)	7.50	8.075*
Str'ling(1)(48)	N15 7.40	7.975*
Struthers,O.(48)	Y1 7.40	7.90†
Worcester,Mass. A7	7.70	

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	173
Atlanta A11	175
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth,Minn. A7	173
Fairfield,Ala. T2	173
Joliet,Ill. A7	173
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
So.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	175
Sterling,Ill.(1) N15	173

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants)

4 in. and shorter:	
½-in. & smaller diam	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+ 3
6 in. and shorter:	
⅝-in. and ⅝-in.	+ 4
¾-in. and larger	+ 6
Longer than 6 in.:	
All diameters	+ 15
Lag bolts, all diams:	
6 in. and shorter	6
Over 6 in. long	+ 2
Ribbed Necked Carriage	+ 4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoe	10
Tire Bolts	+ 3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
⅜" and smaller	55
⅞" to 1⅛", inclusive,	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅜" or smaller	38
⅞" to 1½", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQUARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam x 6 in. and shorter	34
1 in. and smaller diam x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	34
¼ in. diam & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	43
Plated finishes	23

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	38
⅝-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
⅝-in. through 1 in.	7

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	...	19.59	20.41
1¼	13	...	23.21	20.44
1½	13	21.40	26.65	22.60
1¾	13	25.28	30.31	26.71
2	13	28.33	33.97	29.93
2¼	13	31.91	38.26	33.72
2½	12	34.63	41.52	36.59
2¾	12	38.15	45.74	40.31
2¾	12	41.31	49.53	43.65
3	12	44.06	52.82	46.54

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	...	5.65
Fairfield,Ala. T2	...	...	...	5.65
Gary,Ind. U5	4.725	...	...	...
Huntington,W.Va. W7	...	...	...	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	...
Johnstown,Pa. B2	...	...	...(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	...	5.65
Minnequa,Colo. C10	4.725	4.625	...	6.15
Steelton,Pa. B2	4.725	4.625	...	...
Williamsport,Pa. S19	...	...	...	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS (20) Treated

Cleveland R2	11.50
KansasCity,Mo. S5	11.50
Lebanon,Pa. B2	12.40
Minnequa,Colo. C10	12.40
Pittsburgh O3, P14	*12.40*
Seattle B3	12.90

AXLES

Ind.Harbor,Ind. S13	7.25
Johnstown,Pa. B2	7.25

JOINT BARS

Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield,Ala. T2	7.90
Ind.Harbor,Ind. I-2, Y1	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	7.90
Minnequa,Colo. C10	7.90
Pittsburgh J5	7.90
Seattle B3	8.40
So.Chicago,Ill. R2	7.90
Struthers,O. Y1	7.90
Youngstown R2	7.90

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N. Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	21.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns, .83.00-148.00	
Aluminum:	
Atomized, 500 lb drums, frght. allowed Carlots	32.20
Ton lots	34.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	39.00-49.00†
Bronze, 5000-lb lots	58.00-61.50†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	94.00
Nickel-Silver, 5000-lb lots	53.25-60.00†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	94.00
Stainless Steel, 316	$1.25
Tin	14.50*
Zinc, 5000-lb lots	18.25-32.00‡
Tungsten Melting grade, 99% 60 to 200 mesh	Dollars 4.30-4.40
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 5.15c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.20c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 30c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.30c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5	...
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+1.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5	+1.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5	7
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5	7
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5	7
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Sparrows Pt., Md. B2	23	+ 5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5	9
Wheatland, Pa. W9	23	+ 5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1¼		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	....	....	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5	+1.25
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	9	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	....	....	....
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5	0.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

*Galvanized pipe discounts based on current price of zinc (12.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	Shapes; H.R. & C.F. Bars; H.R. Strip	Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	48.00	48.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	39.00	44.25	42.50	45.50	48.25	52.50	52.50
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.50	65.00	63.50	66.00	69.50	73.50	73.50
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	31.00	40.50	48.75	55.25	56.25	57.00	62.00	70.50	70.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Sheets, Carbon Base 20%
Stainless:			
302	....	....	28.00
304	30.30	36.05	29.75
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	42.75
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	34.25
347	34.40	41.40	44.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	24.25
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both Sides
Copper*	26.60	33.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5%Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.090
18.25	4.25	1	4.75	....	2.305-2.475
18	4	2	9	....	2.675-2.6775
18	4	2	....	....	1.765
18	4	1	....	....	1.600
13.75	3.75	2	5	....	2.245
13.5	4	3	....	....	1.865
9	3.5	....	....	....	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Alabama City, Ala. R2	54.50	55.00‡	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00†	....
Woodward, Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	58.50	59.00	59.50	60.00
Tonawanda, N.Y. W12	58.50	59.00	59.50	60.00
No. Tonawanda, N.Y. T9	....	59.00	59.50	60.00
Boston, deld.	69.15	69.65	70.15	....
Rochester, N.Y. deld.	61.52	62.02	62.52	....
Syracuse, N.Y. deld.	62.62	63.12	63.62	....
Chicago District				
Chicago I-3	58.50	59.00	59.00	59.50
Chicago R2	58.50	....	59.00	....
Gary, Ind. U5	58.50	....	59.00	....
So. Chicago, Ill. Y1	58.50	59.00	59.00	59.50
So. Chicago, Ill. U5, W14	58.50	....	59.00	59.50
Milwaukee, deld.	60.67	61.17	61.17	61.67
Muskegon, Mich., deld.	....	65.30	65.30	....
Cleveland District				
Cleveland A7, R2	58.50	59.00	59.00	59.50
Akron, O., deld.	61.25	61.75	61.75	62.25
Lorain, O. N3	58.50	....	....	59.50
Mid-Atlantic District				
Bethlehem, Pa. B2	60.50	61.00	61.50	62.00
New York, deld.	....	64.78	65.28	....
Newark, deld.	63.52	64.02	64.52	65.02
Birdsboro, Pa. B10	60.50	61.00	61.50	62.00
Chester, Pa. C31	54.50	55.00	55.50	....
Philadelphia, deld.	56.16	56.66	57.16	....
Steelton, Pa. B2	60.50	61.00	61.50	62.00
Swedeland, Pa. A3	60.50	61.00	61.50	62.00
Philadelphia, deld.	62.16	62.66	63.16	63.66
Troy, N.Y. R2	60.50	61.00	61.50	62.00
Pittsburgh District				
Neville Island, Pa. P6	58.50	59.00	59.00	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	60.37	60.37	60.87
McKees Rocks, deld.	....	60.04	60.04	60.54
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	60.66	60.66	61.16
Verona, Trafford, deld.	60.69	61.19	61.19	61.69
Brackenridge, deld.	60.95	61.45	61.45	61.95
Bessemer, Pa. U5	58.50	....	59.00	59.50
Clairton, Rankin, So. Duquesne, Pa. U5	58.50	....	....	....
McKeesport, Pa. N3	58.50	....	....	59.50
Midland, Pa. C18	58.50	....	....	....
Youngstown District				
Hubbard, O. Y1	....	....	59.00	....
Sharpsville, Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield, O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie, Pa. I-3	58.50	59.00	59.00	59.50
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	58.50	59.00	....	....
Granite City, Ill. G4	60.40	60.90	61.40	....
Ironton, Utah C11	58.50	59.00	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	60.50	61.00	61.50	....
Rockwood, Tenn. T3	....	55.00‡	59.00	....
Toledo, O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Low phos. southern grade.
†Phos., 0.30 max.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson, O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.50 Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.645% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, (Open-hearth & Fdry. freight allowed K2)	87.50
Keokuk, O.H. & Fdry. 12½ lb piglets, 16% Si, frgt allowed K2	90.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035 max.)	$72.50
Steelton, Pa. B2 (Phos. 0.035 max.)	66.50
Philadelphia, deld.	70.05
Troy, N.Y. R2 (Phos. 0.035 max.)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075 max.)	63.50

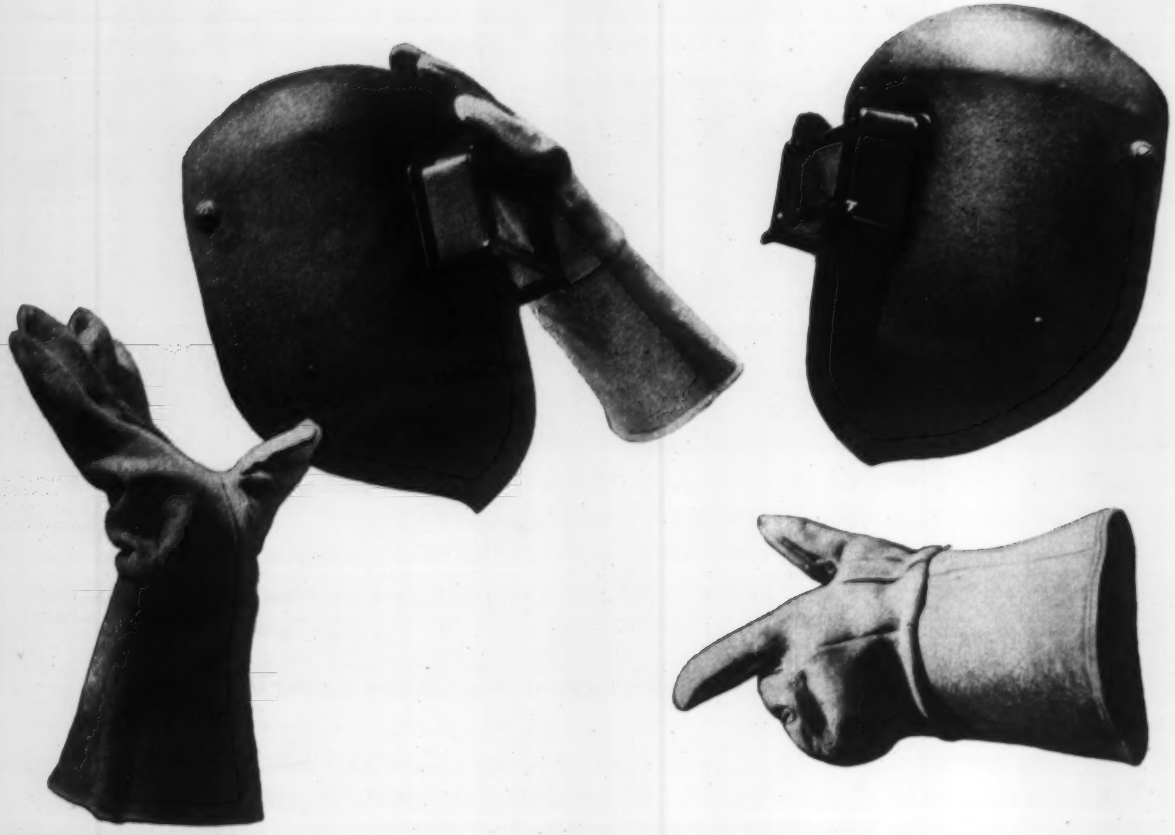
Warehouse Steel Products

Representative prices, cents per pound subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Buffalo, Cleveland, Erie, 30 cents; Chicago, Milwaukee, St. Louis, St. Paul, Detroit, Cincinnati, Pittsburgh, 25 cents; Philadelphia, New York, Baltimore, Boston, San Francisco, Los Angeles, and Portland, Oreg., 10 cents; Atlanta, Houston, Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS				PLATES	
	Hot Rolled	Cold Rolled	Galv. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.§	H.R. Alloy 4140††‡	Standard Structural Shapes	Carbon	Floor
Atlanta	6.79	7.75	8.37	43.43	7.05	...	6.92	8.89	....	7.08	7.09	8.83
Baltimore	7.03	8.32	9.10	....	7.65	...	7.61	8.62‖	13.44	7.93	7.21	8.87
Birmingham	6.70	7.80	8.85	....	6.95	...	7.00	9.35	....	7.20	7.05	9.10
Boston	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
Buffalo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	....	7.10	7.10	8.37
Chicago	6.80	7.93	8.50	46.55	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
Cincinnati	6.92	7.92	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
Cleveland	6.80	7.93	8.85	....	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
Detroit	6.99	8.12	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Erie, Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
Houston	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
Los Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
Milwaukee	6.89	8.02	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
Moline, Ill.	7.15	8.28	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	....
New York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
Norfolk, Va.	7.25	....	....	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
Philadelphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
Pittsburgh	6.80	7.93	9.20	48.67	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
Portland, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	11.80	15.00	7.85	7.75	9.60
Richmond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
St. Louis	7.09	8.22	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
St. Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
San Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25‖	8.25	8.05	10.25
Seattle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
Spokane	8.55	11.00‖	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
Washington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¼-in. and heavier; ††as annealed; ‡‡under ⅛-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 3000 to 999 lb and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; §—500 to 9999 lb; ¶—400 to 999 lb; ‖—4000 lb and over; ‖—1000 to 1999 lb; ‖—1000 lb and over ‖—1500 to 3999 lb; ‖—2000 to 3999 lb; ‖—f.o.b. local delivery in lots of 10,000 lb and over.



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Although Lukens "T-1" steel is a tough, high strength, heat treated steel, equipment builders will find that the techniques of working with this new steel are no different than with carbon steel. Recognizing that higher strength steels require higher pressures to form, proper design procedures will permit this low carbon, quenched and tempered alloy plate steel to be fabricated not only in the shop but also in the field. Those items of equipment which may not have to be stress relieved for dimensional stability or other special reasons can be fabricated of Lukens "T-1" steel to take advantage of its tough "as-welded" characteristics.

In addition to easy fabrication, Lukens "T-1" steel has other benefits of equal value to equipment builders. Three times stronger than carbon steel, this new steel has lighter weight and reduced thickness in comparison to heavier, thicker plates of carbon steel, thereby reducing material, fabrication and shipping costs. Lukens "T-1" steel's excellent resistance to the combination of wear and impact abuse lowers maintenance and replacement costs, lengthens equipment life. Lukens' range of steel plate sizes—including the widest and heaviest plates available anywhere—makes possible additional savings for builders through the use of wider plates that require fewer welded seams.

A new addition to Lukens' complete line of carbon, alloy and clad steels, this new steel's unusual combination of properties suit it especially to applications in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, material selection, application and fabrication techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for Bulletin 765. Address: Manager, Marketing Service, 773 Lukens Building, Lukens Steel Company, Coatesville, Pa.

LUKENS

"T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Russell, Burdsall & Ward Bolt & Nut Co.

The way they are taking hold, high-tensile bolts are a . . .

Fastener with a Future

HIGH-TENSILE BOLTS are being used this year in about 10 per cent of all structural steel joints in the construction industry, the American Institute of Steel Construction estimates. Not bad for a product that got started about four years ago.

Maintaining its pace as one of the fastest growing lines in the fastener business, these bolts have increased sales every year since they came into general acceptance in 1951. Two years ago, they had cornered only about 1 per cent of all field connections. John S. Davey, vice president of Russell, Burdsall & Ward Bolt & Nut Co., estimates that "in five years, an overwhelming majority of new buildings erected will be fastened with high-strength bolts."

Great Hopes—Some boltmakers may not be so optimistic as Mr. Davey, but they all agree that the past year has seen a great breakdown in the resistance of many contractors and designers to "something new," which has been the big reason for increased sales.

The shortage of skilled workers needed for other methods of structural fastening has helped, too. Bolters need no special training. Two men make up a team. Two teams, the equivalent of one riveting team, can install more than 6000 bolts a day, making it the fastest method of erection available, some officials believe. Installation equipment is inexpensive and easy to handle. A torsion and a back-up wrench are all that are needed.

Silence!—One of the biggest advantages this method offers in construction near residential areas is its comparative silence. For this reason, many hospitals are specifying bolted construction for expansion and modernization, as well as new construction.

One bottleneck to the advancement of bolted structures has been city building code restrictions. Much headway has been made the past year. Some codes have been changed or exceptions to them have been made.

Redesign Coming—Most structural joints require the same number of fasteners whether rivets or bolts are used. But the Research Council on Riveted and Bolted Structural Joints is considering redesign. Some boltmakers think this will take one of two directions, or possibly both: Reduction of the safety factor may be possible because bolts are not subject to heat, impact and other field-construction variables. They are manufactured to precise specifications which are independent of installation conditions.

Redesign also could permit fewer bolts per joint because of their strength. Most manufacturers feel that even though this might cut down the number of bolts per ton of structural steel, it will increase overall use because of the economy.

Higher but Lower—The original unit cost of high-tensile bolts is greater than other structural fasteners, but boltmakers claim the installed cost is less. Most of them believe they have a product that is fairly priced and do not see much of a decline in cost in the near future. As the production increases, there may be some downward adjustment. But as one manufacturer points out: "They will never be a cheap item, because cost is built into them. Installed cost is what sells them."

And sales are expected to continue climbing at the present rate for several years, in the opinion of most producers. Typical of their attitude is the comment of one manufacturer that has been in the field only a short time: "We stock high-strength bolts, and you can't afford to stock an item like that unless you see a demand for them."

Steel Bars . . .

Bar Prices, Page 108

Generally well oversold, hot-rolled carbon bar producers are allotting tonnage for fourth quarter delivery. Some mills haven't more than six weeks of production to apply to new orders. Mills not out of the market entirely for the closing quarter could be—if they were willing to accept business offered them.

Hot-rolled alloy bar supply is relatively easy. Tonnage is available for delivery before the end of the third quarter.

Sellers of cold-finished bars are entertaining substantial volume business, but they could handle still more were supplies of hot bars freer.

Crucible Steel Co. of America has issued a tentative price schedule on hot and cold-finished bars covering the new military standard for continuous marking (Mil-Std-183). The

company has installed experimental equipment. Depending on the surface condition ordered, it may be necessary to do considerable cleaning to put the bars in condition for marking. Problems may arise that would put costs above the charge for marking.

The tentative price schedule:

Hot or cold-finished bars (of any section)	
½-in. to less than ¾-in.	2.25c per lb
¾-in. to less than 1⅛-in.	1.25c per lb
1⅛-in. to less than 1½-in.	1.00c per lb
1½-in. and over	0.75c per lb

Minimum diameter or width ½-in.
Minimum charge $10

Northeastern Steel Corp., Bridgeport, Conn., will start bar production in the first quarter next year. It is taking orders for that period on a wide range of smaller sizes of alloy and carbon bars.

Labor difficulties in the farm machinery industry have been threatening some curtailment in hot-rolled carbon bar consumption. The industry is a substantial user of bars.

There have been two strikes. One was settled after a 5-day suspension, suggesting that a pattern for settlement possibly has been set for the other struck plant.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 109 & 110

Producers of hot and cold-rolled sheets that haven't sold out for the remainder of the year (there are a few) could do so if they so desired. All makers are well behind on commitments and will have carry-overs of four to six weeks at the end of the current quarter. This will leave them with only two months of capacity, possibly less, to care for such new tonnage as they take on.

Much this same situation, in even greater degree, applies to electrical sheets and enameling stock. Stainless sheets are in less tight position, but deliveries of this grade are becoming more extended steadily. Some large makers are finding themselves in a better position on galvanized sheets than they are on most other grades. They are reasonably current. Some fourth quarter tonnage is still open. However, a new government grain bin program may put a crimp in this comparatively easy supply situation.

Significantly, the St. Louis district producer has cut exports of galvanized roofing sheets 20 to 25 per cent to care for domestic requirements. The usual seasonal slump in galvanized sheet business hasn't been experienced this summer in the area served by this mill.

No cancellations of consequence are reported. In fact, consumers are clamoring for far more tonnage than their allotments call for. So strong is demand for cold-rolled sheets and enameling stock, manufacturing plants whose operations have been throttled by strikes are arranging to have incoming steel tonnage warehoused rather than defer shipments from the mills.

Pittsburgh district producers are warning salesmen against overselling fourth quarter tonnage. Production in the area this quarter may fall below estimates, resulting in further delays in shipments. Output the last two weeks was off 4 to 5 per cent from estimates. Because of the tight supply condition, mills are declining abnormally large orders to be able to take care of regular requirements of customers.

New England consumers of flat rolled see the present situation closely paralleling that in the second half of 1953: Orders in excess of productive capacity; competition among finished products for available semifinished steel supply; delinquent deliveries with at least one month's production blanked out in the fourth quarter to care for the overflow from the preceding three months.

October order books of St. Louis area mills are 80 per cent filled, with specifications now in hand. November books are about 55 per cent filled.

Wire . . .

Wire Prices, Pages 110 & 111

Manufacturers wire sales in the third quarter are responding to the generally high level of industrial activity which has prevailed this summer. Wire mills, however, are not booked as full as are those producing other products, such as sheets, plates, bars and shapes. Consumers can still place tonnage for third quarter shipment although delivery time and backlogs are lengthening.

Buyers are ordering for fourth quarter shipment, and the wire market outlook over the remainder of the year is promising. Mills expect to sell all they can produce without difficulty. Makers of flat-rolled products and wire are finding the stress is on production of sheets, slowing wire output to some extent.

Springmakers in the East are going full tilt on 1956 automobile orders. Between model changes, demand for high carbon spring wire has slackened little. Furniture, bedding and

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Men would not accept either idea at first . . .

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ¾–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Selecting the Proper Die Head for the Job"

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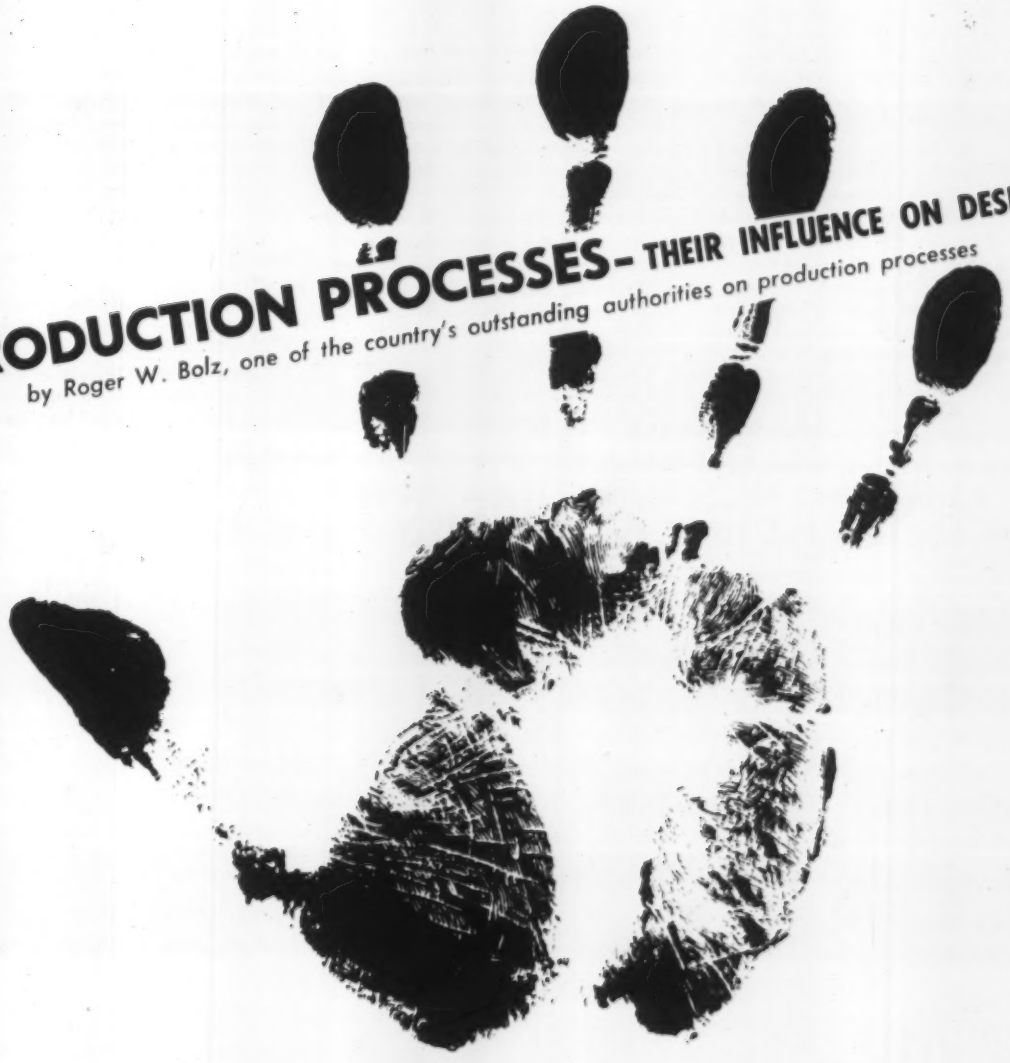
PRODUCTION PROCESSES—THEIR INFLUENCE ON DESIGN

by Roger W. Bolz, one of the country's outstanding authorities on production processes



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upholstery wire grades for coils are sold well through the third quarter, and, as shipments become more extended, fourth quarter orders are appearing in heavier volume, including manufacturers bright wire.

Wire products used in highway construction are booked into November. Inventories of welded fabric guard rail and stranded cable, both with the mills and distributors are lower in New England. Most larger wire consuming industries are covered for the third quarter and more fourth quarter volume is being booked in the district.

Plates . . .

Plate Prices, Page 108

Rising demand for new freight cars is putting an increasing squeeze on plate supplies. Deliveries are lengthening, and some mills are virtually out of the market for remainder of the year.

Carbuilders and the railroads themselves (they are doing some car construction and repairs of their own) are offering the mills far more tonnage than they can handle—at least within the time deliveries are desired. The steel stringency, which applies to plates, sheets, bars, structurals and other railroad car steel items, is forcing the car equipment interests to push back their schedules.

Shipyard requirements are expanding, although more gradually than car needs. Largest new ship contract involves the award of two tankers of 35,420 deadweight tons to the Newport Shipbuilding & Dry Dock Co., Newport News, Va., for the Esso Shipping Co. The vessels will cost $20 million.

Bethlehem Steel Co.'s Staten Island yard in New York is apparently low on a new type ice breaker and oil tanker for the Military Sea Transportation Service. Bethlehem's fixed price bid was $4,234,000 for one and $3,833,000 for two. It also bid on an adjusted price basis.

Central Iron & Steel Co., Harrisburg, Pa., last week advanced its price on carbon plates to 5.10c, f.o.b. mill. The price, effective Aug. 1, amounted to an increase of $12 per ton over the company's previous quotation and those of district competitors.

New England shipyards will expand plate consumption in the fourth quarter. Plate stocks in at least one yard are substantial. Tank and pressure vessel fabrication also is likely to increase.

Granite City Steel Co. has boosted plate production 20 per cent in response to insistent demand. Normally, the company holds plate production to a minimum.

Tubular Goods . . .

Tubular Goods Prices, Page 112

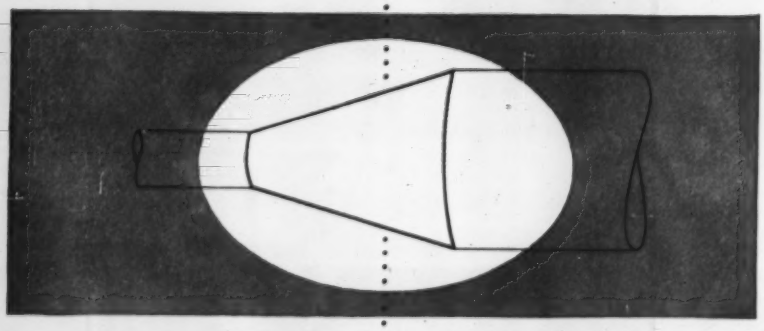
Several smaller producers of tubular products are protecting regular customers by putting a virtual quota system into effect, notably in sales of oil country goods and mechanical tubing for third quarter. Heavy demand for those items has sales managers worried about overselling. While major mills at Pittsburgh can fill third quarter orders, smaller firms are turning away exceptionally large business.

Mechanical tube orders are flowing in for the fourth quarter. With hot weather slowing mill operations, producers may not be able to fill all third quarter orders on time. Deliveries have slowed down.

Lone Star Steel Co., Dallas, recently rescinded price increases (made in July) on line pipe, casing and steel plate. The reason: The company's offer to pay retroactive wages to its employees, effective July 1, provided they agreed to a proposed new contract. It was voted down, and management feels the higher prices would be in bad faith.

The company is issuing credit

TITUSVILLE
FORGED PIPE REDUCERS



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Offices in Principal Cities

memorandums to cover the difference in old prices and those revoked. One exception is tubing, the new price on which holds unchanged because Lone Star purchases it from outside sources.

The company's contract with the union does not expire until Sept. 7. It had offered its employees in bargaining unit jobs the same rates agreed upon by the other steel companies July 1.

James B. Clow & Son Inc. plans expansion at its National Works, Birmingham, for the production of cement-lined cast iron pressure pipe. Modernization of the plant's fittings foundries is under way and will be completed next year. Included in the improvements is a large capacity electric furnace.

Structural Shapes . . .

Structural Shape Prices, Page 108

Structural steel business is booming. Not only are substantial tonnages coming out for public highway and building projects, but new industrial construction requirements are appearing. The market last week was featured by the placing of about 60,000 tons of structurals by the Fisher Body Division, General Motors Corp., for two stamping plants, one at Mansfield, O., the other at Marion, Ind.

Each plant will take about 30,000 tons of structurals. The Mansfield tonnage was placed with Bethlehem Steel Co. The Marion tonnage went to American Bridge Division, U. S. Steel Corp. These plants are the largest industrial projects to come onto the market in a long time. Both plants, it is understood, will be identical, each with 1,776,000 sq ft of floor space.

In the East a rash of new state bridge inquiry has developed for bidding Aug. 26.

Pressure for structurals is increasing in New England. Shipments are sought not only for plain material to meet fabricating shop commitments against firm contracts but also new tonnage. Producers are behind on shipments, notably on wide flange sections.

Phoenix Iron & Steel Co., Phoenixville, Pa., last week advanced its prices on standard and wide flange sections to 5.15c, f.o.b. mill. The prices, effective Aug. 1, are $10 per ton above those the company previously quoted and those of its nearest competitor.

Reflecting expanding demand for structurals this year, the latest report of the American Institute of Steel Constructon places June contracts at 318,150 tons, the high point for the first six months. This compares with revised figures for May of 303,343 tons, and brings the total for the first half of the year to 1,652,411, compared with 1,241,534 tons in the like 1954 period.

June shipments were 282,325 tons, compared with the revised May total of 222,991 tons. While the highest reported for the year to date, June shipments were slightly below those of June, 1954.

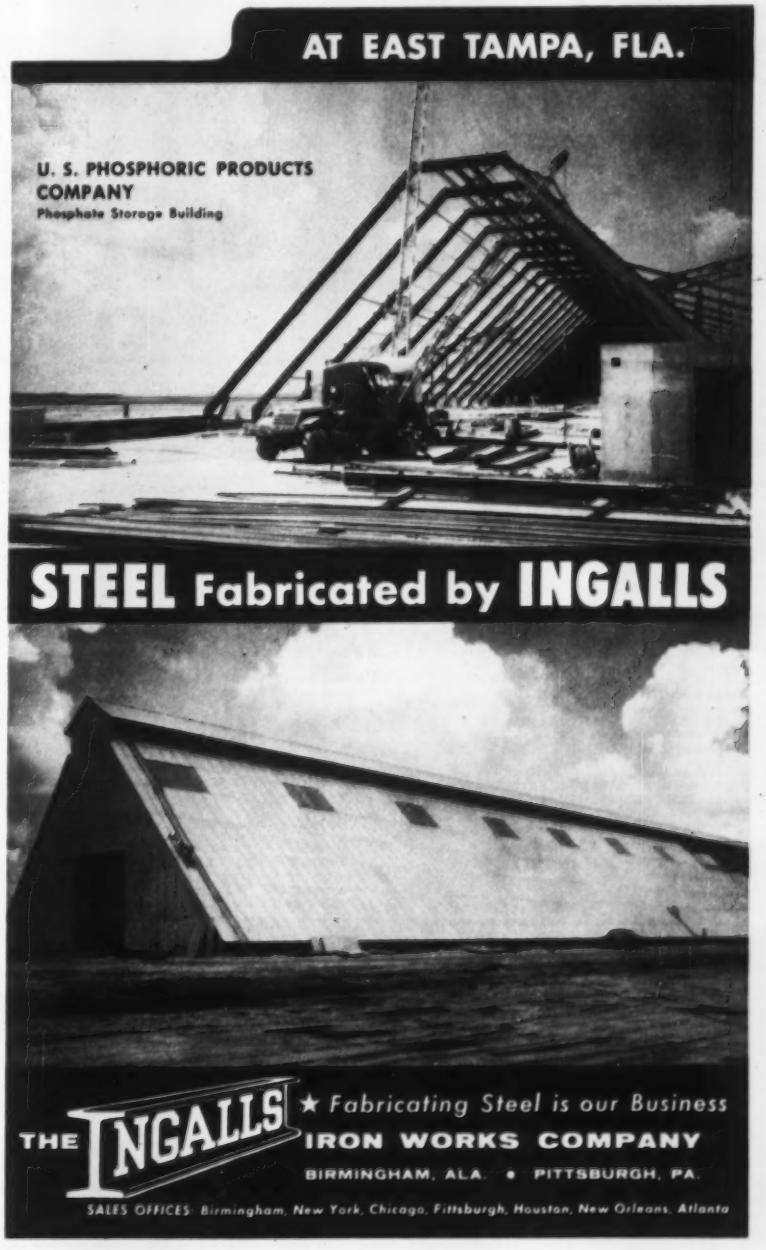
Industry backlogs, as of June 30, totaled 1,705,957 tons, of which 990,739 tons were reported as being available for fabrication during the following four months.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 133

Coke production in May, 6,425,213 net tons, bettered that of April by 5 per cent, reports the Bureau of Mines. The gain was due in part to the longer work-month and also to higher production rates for both slot-type and beehive ovens.

Oven coke stocks at the end of May amounted to 2,346,041 net tons, equal to 11.6 days of production. At the end of May last year, stocks amounted to 3,011,996 tons, equal to 18.2 days of production.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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max, 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max); Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.70c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, C 0.025% max. (Simplex 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered, Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. 8 M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.60c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 18.35c per lb of alloy, ton lot 19.2c; less ton lot, 20.4c, delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grades, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max) $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.5c, less ton 16.7c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton, 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.60% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Boriam: (B 1.5%-1.9%). Ton lots, 46c per lb; smaller lots, 50c per lb.

Carboriam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.05c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 11.85c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.45c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.55c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.7c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 9.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.80-$6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max.) Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, deld.; less ton lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carloads packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5.7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy, ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

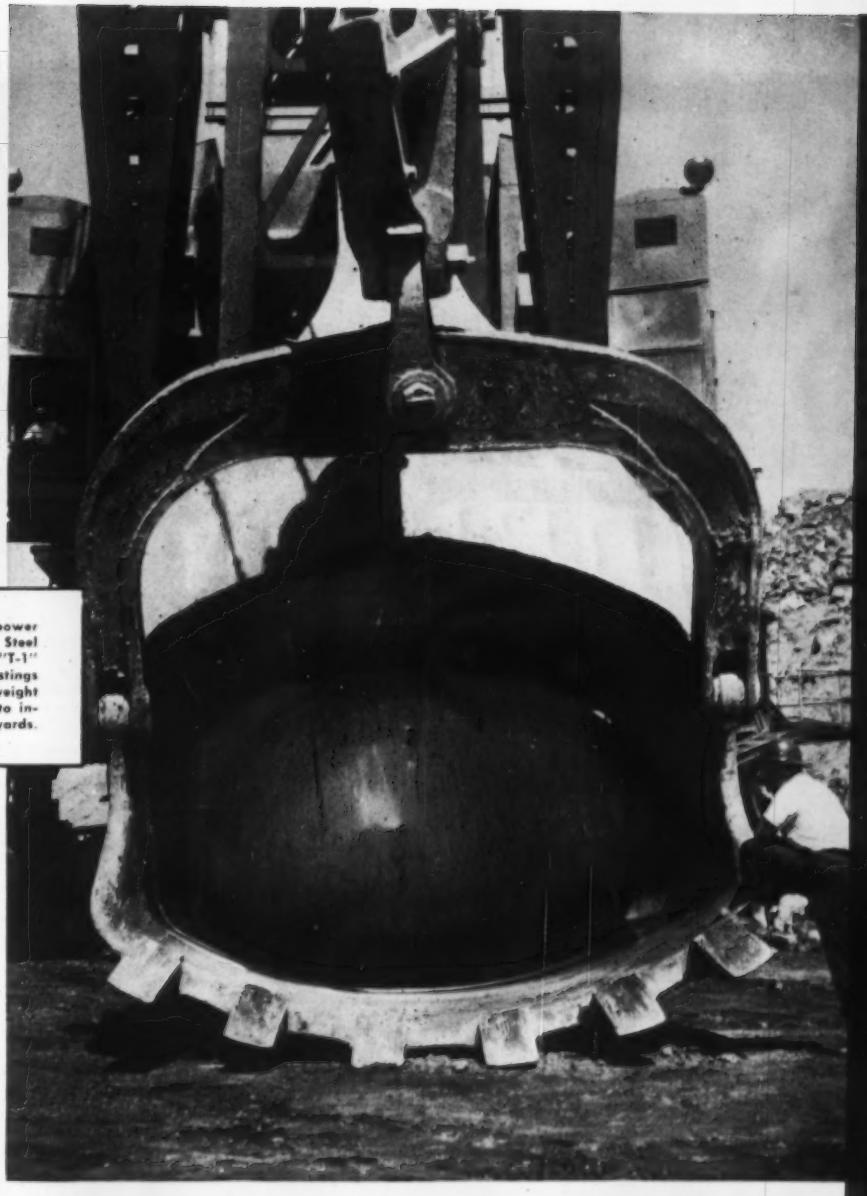
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn. $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.46 in all sizes except powdered which is $1.57; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.25 in cans; in bags, $1.24, f.o.b. Langeloth, Pa.; Washington, Pa., $1.24.



The entire shell of the bucket on this 50-cu. yd. power shovel is fabricated from ¾" and 6½" "T-1" Steel Plate. Liner plates are made of ½" "T-1" Steel. "T-1" Steel Plate only 6½" thick has replaced large castings a foot thick in the lip of the bucket. Lighter weight construction with "T-1" Steel made it possible to increase the cubic capacity of the bucket by ten yards.

How USS "T-1" STEEL in big machines cuts weight, cuts cost, increases service life

Hanna Coal Company just can't afford to have this giant 50-cu. yd. shovel break down. This machine can move 2,280,000 tons of material a month, and it must operate continuously—24 hours a day, 7 days a week—to pay off.

Strong, weldable "T-1" Steel has improved the performance of this incredibly rugged machine, and it also has cut cost and weight. It enables the designers to use *fabricated* parts in place of larger, heavier, more expensive castings. And these lower-cost fabricated parts actually *last longer* than castings. As a result, Hanna Coal Company has standardized on "T-1" Steel for the vital parts of much of its heaviest-duty equipment.

Write for complete information on new USS "T-1" Steel. It has application in pressure vessels, rotating machinery, structural steel towers, steel mill equipment, big trucks, mine cars, and elsewhere.

WHAT'S "T-1" GOT?

AT HIGH TEMPERATURES. "T-1" has good creep rupture strength up to 900° F. and is being used with great success in heavy-duty, high temperature applications.

AT LOW TEMPERATURES. "T-1" is amazingly tough at temperatures far below zero . . . has withstood impacts of 2,000,000 ft. lbs. at 38 degrees below zero.

IN FABRICATION. "T-1" can be welded or flame cut without pre- or post heating . . . and the welds develop the full 90,000 psi yield strength.

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USS

S-475

UNITED STATES STEEL

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Ores

Lake Superior Iron Ore

(Prices effective for the 1955 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$10.40
Old range nonbessemer	10.25
Mesabi bessemer	10.25
Mesabi nonbessemer	10.10
Open-hearth lump	11.25
High phosphorus	10.00

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% (spot)	24.00-26.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$31.50-$32.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 85c-87c per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, 75c-80c.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$52.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	31.00-32.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

56-60%	$3.50-$3.80
60-65%	3.80-4.25

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133; Los Angles, Pittsburg, Calif., $137.20.

Super-Duty: St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., Hawston, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Cutler, Utah, $121.55; Los Angeles, $127.85.

Super Duty: Hays, Sproul, Hawston, Pa., Warren, Windham, O., Athens, Tex., $145; Morrisville, Pa., Niles, O., $148; Joliet, Ill., $151.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $125; Woodbridge, N. J., $122.

Insulating Fire Brick (per 1000)

2300° *F:* Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Mexico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala., $212.80.

Ladle Brick (per 1000)

Dry Pressed: Bessemer, Ala., $64.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98; Peria, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30.

High-Alumina Brick (per 1000)

50 *Per Cent:* Clearfield, Pa., St. Louis, Mexico, Mo., $194; Danville, Ill., $169.30.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $241; Danville, Ill., $213.20.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $258; Clearfield, Pa., $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30; Athens, Tex., $155.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Athens, Tex., $247.70; Bridgeburg, Pa., $286.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80; Athens, Tex., $191.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅝-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.50-$14.00
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.50
Camden, N. J., ovens	24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	25.75
Chicago, deld.	27.25
Terre Haute, Ind., ovens	25.50
Milwaukee, ovens	26.25
Indianapolis, ovens	25.50
Cincinnati, deld.	27.10
Painesville, O., ovens	*26.25*
Cleveland, deld.	*28.18*
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	24.00
Swedeland, Pa., ovens	24.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	24.25
Portsmouth, O., ovens	24.00
Cincinnati, O., deld.	26.62
Detroit, ovens	*26.25*
Detroit, deld.	*27.25*
Pontiac, deld.	*27.81*
Saginaw, deld.	*29.33*

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	36.00
Toluol, one deg.	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol, 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $35-$36; 70%, $32-$33; 60%, $28-$29. Imported, net tons, duty paid, metallurgical grade: European, $28-$30; Mexican, $25.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length (Inches)	Per 100 lb
2	24	$47.75
2½	30	30.75
3	40	30.00
4	40	28.50
5⅛	40	28.25
6	60	25.50
7	60	25.25
8, 9, 10	60	22.75
12	72	26.00
14	60	22.50
16	72	21.50
17	60	22.00
18	72	21.50
20	72	21.25

CARBON

8	60	11.40
14, 12, 10	60	11.10
14	72	10.25
17	60	10.25
17	72	9.85
20	84	9.85
20	90	9.65
24	72, 84	9.85
24	96	9.60
30	84	9.75
40, 35	110	9.50
40	100	9.50

MEMORANDUM
Write to J+L for this new book on the modern method of heat treating cold finished steel bars
NOTE:
Electreat (the modern J&L method) is characterized by exceptionally accurate control of heating and quenching.
Electreated bars can be used to produce parts having heat-treated properties—without the need for costly and perhaps undesirable heat-treating operations.
For some products, you may use Electreated carbon steel in place of alloy steel.
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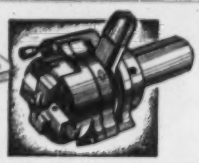

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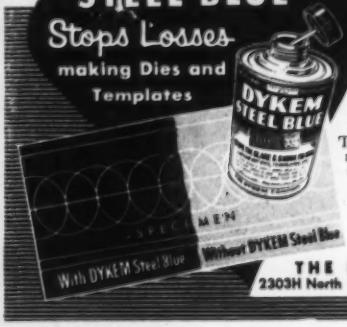

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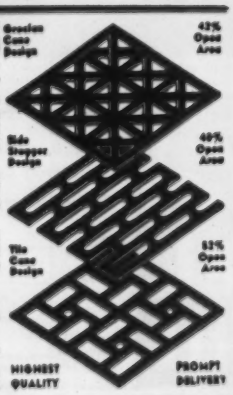

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Scrap . . .

Scrap Prices, Page 126

Pittsburgh—Brokers are paying more for scrap to cover earlier orders—up to $45 a ton for No. 1 heavy melting in some cases to cover $40 orders. Their buying price last week averaged $43 a ton for that commodity. Although mills haven't increased their purchases of scrap, brokers are doing some hectic scouring of the area for good No. 1 heavy melting. Punchings and plate scrap also are in short supply, causing higher quotations.

New York—Continued pressure for steel scrap is causing brokers to advance prices as much as $1 and $1.50 on some grades. No. 1 heavy melting and No. 1 bundles are $38-$39; No. 2 heavy melting, $34.50-$35; and No. 2 bundles, $26-$27.

Machine shop turnings are higher at $17-$18 as are mixed borings and short turnings at $18-$19. Short shovel turnings are up to $19.50-$20. Brokers' buying prices on low phos structural and plate have jumped to $41; unstripped motor blocks, to $24-$25; and heavy breakable cast, to $36-$37.

Philadelphia—Steel scrap prices continue to soar. Major items are up $1 to $1.50. Machine shop turnings and mixed borings and turnings are up $2.

Export demand is off, although a good tonnage is moving against old orders.

Boston—Steel scrap prices are advancing, with differentials between the grades narrowing. Shipments are heavier to eastern Pennsylvania consumers, and prices for top grade heavy melting steel for Worcester delivery are higher. Cast iron grades continue to lag.

Cincinnati—Scrap prices surged upward in one of the strongest rises recorded in the last several years. No. 2 bundles led the open-hearth grades with an advance of $6. No. 1 steel went up $4, and No. 2 heavy melting, $3.

Detroit—The scrap market is strong here. Supplies are short, and demand is heavy. Brokers are short on supplies for old orders. No. 1 heavy melting is quoted at $39, No. 2 heavy melting at $28, No. 1 bundles at $39, No. 2 bundles at $27, No. 1 busheling at $39, machine shop turnings at $19, mixed borings and turnings at $19 and short shovel turnings at $21.

Chicago—The trend of the scrap market continues upgrade, although activity seems to lack some of its recent feverishness. Buyers are more cautious, and the heat is holding scrap consumption down somewhat as steelmaking falls short of projections.

Birmingham—Brokers are having difficulty acquiring scrap to fill orders recently placed by district steel mills. Some are paying more for material than they are getting for it.

St. Louis—The drought of steel scrap in this district at old prices last week smashed the price-resistance line melters had maintained for months. Melting steel was marked up as much as $6 a ton, railroad grades, $2 to $6.

Cleveland—Prices on steelmaking and foundry grades of scrap continue to rise here despite the absence of heavy buying by local mills. No. 1 heavy melting steel is quoted about $4 per ton higher at $43.50-$44.50, based on substantial sales to mills in the Valley at $46-$47. Signs were developing last week to indicate the market is beginning to level off.

Los Angeles—Substantial tonnages of steelmaking scrap continue to move from southern California ports to Japan.

San Francisco—No. 1 cupola cast, recently quoted in a range of $40 to $43 a ton, delivered, has moved up to a firm $45. The increase reflects steady operating rates by foundries and the higher level of pig iron prices. Steel scrap is firm.

Warehouse . . .

Warehouse Prices, Page 113

The higher prices put into effect by warehouses last month following increases at the mill level are expected to boost substantially distributors' business this month on a dollar basis. Some jobbers think the dollar total will make August the best month to date despite the fact volume is likely to be down on a tonnage basis from the June peak. It will be above that for July, however.

Jobbers' greatest problem concerns inventories. They are under such demand pressure they are having difficulty maintaining balanced stocks of popular items. Sales are exceeding receipts from the mills. Plates are in especially short supply at some points. Shapes, bars and sheets are almost as tight.

Demand is holding up surprisingly well. A sizable slump this month had been expected by Chicago district warehouses following active demand in June and July. But only a mild dip has developed, and, as things are shaping up, it looks like September will be a good month.

The distributors are experiencing difficulty in placing fourth quarter tonnage orders with the mills, especially structurals and plates.

Pig Iron . . .

Pig Iron Prices, Page 113

While reflecting vacation suspensions and hot weather, foundry operations are holding up much better than had been expected earlier this summer. More pig iron is being consumed than had been anticipated. Buying, while off from earlier in the year, is holding up well.

August volume demand is expected to better that of July. Further improvement is seen after Labor Day.

Demand is described as steady at

(*Please turn to Page* 128)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 3	$43.17
July 27	42.00
July Avg.	39.67
Aug. 1954	28.80
Aug. 1950	40.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	*43.00**
No. 2 heavy melting	39.00*
No. 1 bundles	*43.00**
No. 2 bundles	36.00*
No. 1 busheling	*43.00**
Machine shop turnings	22.50-23.50
Mixed borings, turnings	22.50-23.50
Short shovel turnings	26.50-27.50
Cast iron borings	26.50-27.50
Cut structurals, 3 ft lengths	*44.00-45.00*
Heavy turnings	39.00-40.00
Punchings & plate scrap	*44.00-45.00*
Electric furnace bundles	*43.00-45.00*

Cast Iron Grades

No. 1 cupola	40.00-41.00
Charging box cast	35.00-36.00
Heavy breakable cast	35.00-36.00
Unstripped motor blocks	25.00-26.00
No. 1 machinery cast	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	*43.50-44.50*
Rails, 2 ft and under	*50.50-51.50*
Rails, 18 in. and under	*51.50-52.50*
Rails, random lengths	*47.50-48.50*
Railroad specialties	*49.00-50.00*

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	110.00-120.00
430 bundles & solids	100.00-105.00
430 turnings	60.00-65.00

*Brokers' buying price

CLEVELAND

(Delivered consumers's plant)

No. 1 heavy melting	*43.50-44.50*
No. 2 heavy melting	32.00-33.00
No. 1 bundles	*43.50-44.50*
No. 2 bundles	29.00-30.00
No. 1 busheling	*43.50-44.50*
Machine shop turnings	23.00-24.00
Mixed borings, turnings	*27.00-28.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Low phos.	*45.00-46.00*
Cut structural plates 2 ft and under	*48.00-49.00*
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	*43.50-44.50*

Cast Iron Grades

No. 1 cupola	*47.00-48.00*
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	*37.00-38.00*
Unstripped motor blocks	*29.00-30.00*
Brake shoes	35.00-36.00
Clean auto cast	*48.00-49.00*
Burnt cast	*37.00-38.00*
Drop broken machinery	*48.00-49.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*
R.R. malleable	*50.00-51.00*
Rails, 2 ft and under	*53.00-54.00*
Rails, 18 in. and under	*54.00-55.00*
Rails, random lengths	*48.00-49.00*
Cast steel	*43.00-44.00*
Railroad specialties	*50.00-51.00*
Uncut tires	*46.00-47.00*
Angles, splice bars	*51.00-52.00*
Rails, rerolling	57.00-58.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	250.00-260.00
18-8 turnings	120.00-130.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	*46.00-47.00*
No. 2 heavy melting	35.00-36.00
No. 1 bundles	*46.00-47.00*
No. 2 bundles	32.00-33.00
No. 1 busheling	*46.00-47.00*
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	*46.00-47.00*
Electric furnace bundles	*46.00-47.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*

CHICAGO

No. 1 heavy melting	*41.00-43.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*43.00-44.00*
No. 1 dealer bundles	*40.00-41.00*
No. 2 bundles	31.00-32.00
No. 1 busheling	*41.00-43.00*
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*29.00-30.00*
Cut structurals, 3 ft	*44.00-45.00*
Punchings & plate scrap	*45.00-46.00*
Electric furnace bundles	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	*37.00-39.00*
Unstripped motor blocks	32.00-33.00
Clean auto cast	49.00-50.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
R.R. malleable	*51.00-52.00*
Rails, 2 ft and under	*56.00-57.00*
Rails, 18 in. and under	*57.00-58.00*
Angles, splice bars	*53.00-54.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	255.00-265.00
18-8 turnings	130.00-140.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

Chicago Mercantile Exchange

(Week ended Aug. 3)

	High	Low	Close
No. 1 Heavy Melting			
	High	Low	Close
Oct.	....	....	39.00*
Jan.	....	....	....

Sales (160-ton units): None.
*Nominal.

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*39.00*
No. 2 heavy melting	*28.00*
No. 1 bundles	*39.00*
No. 2 bundles	*27.00*
No. 1 busheling	*39.00*
Machine shop turnings	*19.00*
Mixed borings, turnings	*19.00*
Short shovel turnings	*21.00*
Punchings & plate scrap	42.00

Cast Iron Grades

Charging box cast	32.00
No. 1 cupola	39.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	42.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	23.00-24.00
No. 1 busheling	32.00-33.00
Cast iron borings	15.00-16.00
Short shovel turnings	24.00-25.00
Machine shop turnings	18.00-19.00
Electric furnace bundles	32.00-33.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	*38.00-39.00*
Structural plate, 2 ft	36.00-37.00
Unstripped motor blocks	35.50-36.50

Railroad Scrap

No. 1 R.R. heavy melt.	*38.00-39.00*
Rails, 2 ft and under	44.00-45.00
Rails, 18 in. and under	*48.00-49.00*
Rails, rerolling	*51.00-52.00*
Rails, random lengths	*43.00-44.00*
Angles, splice bars	43.00-44.00
Std. steel axles	35.00-36.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	*39.50*
No. 1 bundles	*44.00-45.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*44.00-45.00*
Electric furnace bundles	*45.00-46.00*
Machine shop turnings	*28.00*
Mixed borings, turnings	*28.00*
Short shovel turnings	*29.50*
Structurals & plate	*46.00-47.00*
Heavy turnings	*40.00-41.00*
Couplers, springs, wheels	*47.00*
Rail crops, 2 ft under	*53.00*

Cast Iron Grades

No. 1 cupola	*36.00-38.50*
Malleable	46.00
Heavy breakable cast	*44.00*
Drop broken machinery	45.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*34.50-35.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*26.00-27.00*
Machine shop turnings	*17.50-18.00*
Mixed borings, short turnings	*18.50-19.00*
Short shovel turnings	*19.50-20.00*
Low phos. (structural & plate)	*41.00*

Cast Iron Grades

No. 1 cupola	32.00-33.00
Unstripped motor blocks	*24.00-25.00*
Heavy breakable	*36.00-37.00*

Stainless Steel

18-8 sheets, clips, solids	*265.00-270.00*
18-8 borings, turnings	*135.00-140.00*
430 sheets, clips, solids	*115.00-120.00*
410 sheets, clips, solids	*100.00-105.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-35.50*
No. 2 heavy melting	*28.00-28.50*
No. 1 bundles	*35.00-35.50*
No. 2 bundles	*25.00-25.50*
Machine shop turnings	*16.50-17.50*
Mixed borings, turnings	*15.50-16.50*
Short shovel turnings	*20.00-21.00*
No. 1 cast	30.00-31.00
Mixed cupola cast	28.00-29.00
No. 1 machinery cast	33.00-34.00

BUFFALO

No. 1 heavy melting	*39.00-40.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*39.00-40.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*39.00-40.00*
Mixed borings, turnings	*28.00-29.00*
Machine shop turnings	*26.00-27.00*
Short shovel turnings	*29.00-30.00*
Cast iron borings	*28.00-29.00*
Low phos.	*42.00-43.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*40.00-41.00*
No. 1 machinery	*43.00-44.00*

Railroad Scrap

Rails, random lengths	*41.00-42.00*
Rails, 2 ft and under	*46.00-47.00*
Railroad specialties	*41.00-42.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*41.50-42.50*
No. 2 heavy melting	*35.50-36.50*
No. 1 bundles	*41.50-42.50*
No. 2 bundles	*34.50-35.00*
No. 1 busheling	*41.50-42.50*
Machine shop turnings	*27.00-28.00*
Mixed borings, turnings	*24.00-25.00*
Short shovel turnings	*32.00-33.00*
Cast iron borings	*24.00-25.00*
Low phos., 18 in.	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	38.00-39.00
Charging box cast	*38.00-39.00*
Drop broken machinery	*49.00-50.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00†*
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	44.00-45.00

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*36.50*
No. 2 heavy melting	*34.00*
No. 1 bundles	*36.50*
No. 2 bundles	*29.50*
Machine shop turnings	*25.00*
Short shovel turnings	*27.00*

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	*35.00*
Clean auto cast	*45.00*
Stove plate	*37.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00*
Rails, 18 in. and under	*51.00*
Rails, random lengths	*47.00*
Rails, rerolling	*60.00*
Angles, splice bars	*49.00*

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	33.00
No. 2 heavy melting	29.00
No. 1 bundles	*28.00*
No. 2 bundles	23.00
No. 3 bundles	*19.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, No. 1	*39.00-42.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*35.00*
Heavy breakable cast	*30.00*
Unstripped motor blocks	*29.00*
No. 1 wheels	*30.00-33.00*
Stove plate (f.o.b. plant)	*25.00*
Brake shoes	28.00-29.00

Railroad Scrap (Delivered consumer's plant)

Rails, random lengths	*33.00*

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	25.00
Machine shop turnings	10.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00-45.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	32.00
No. 2 bundles	27.00
No. 1 busheling	32.00
Machine shop turnings	12.00
Mixed borings, turnings	12.00
Short shovel turnings	14.00
Cast iron borings	14.00
Cut structurals	34.00
Heavy turnings	12.00
Punchings & plate scrap	32.00

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	48.00

HAMILTON, ONT.

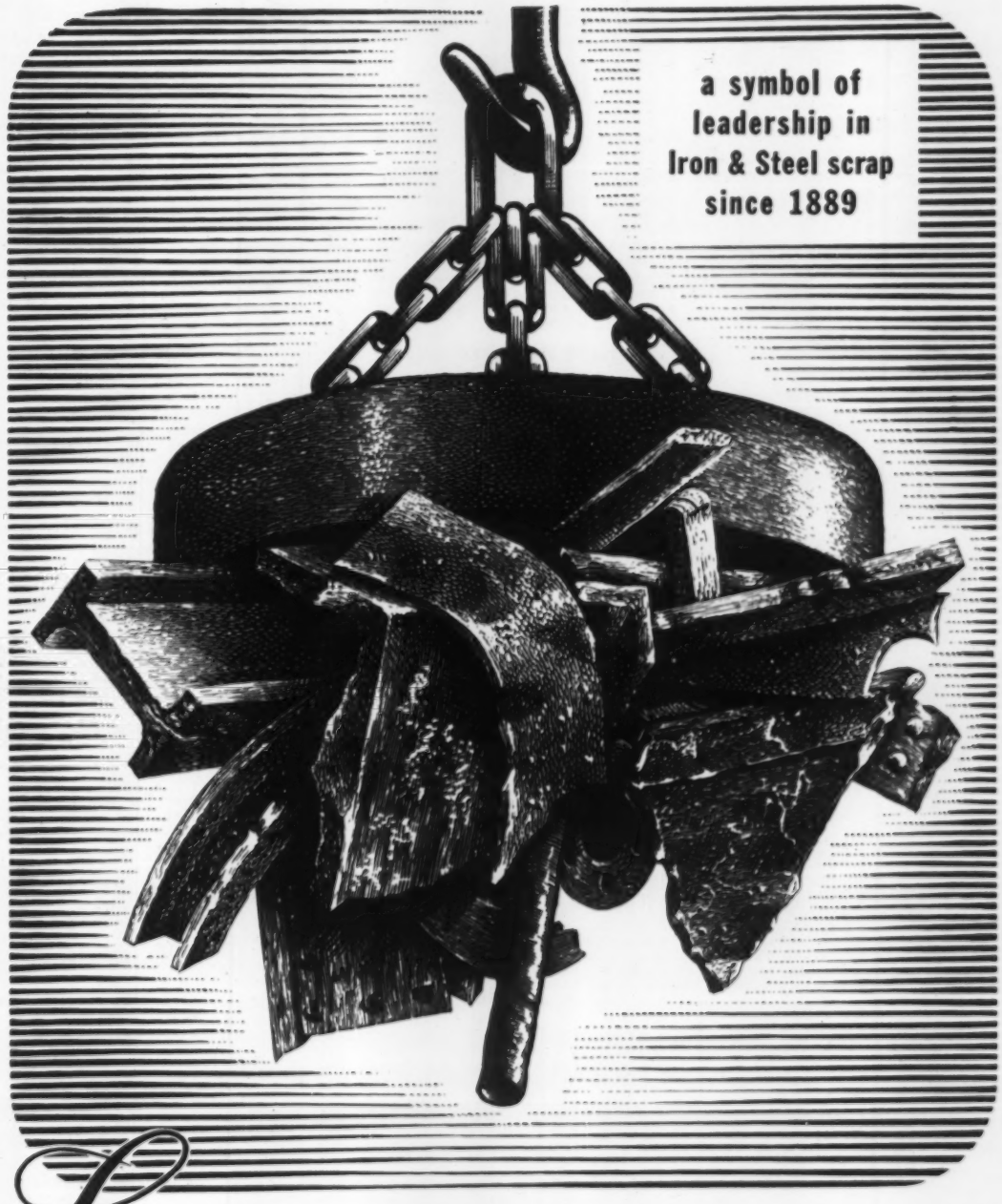
(Delivered prices)

No. 1 heavy melting	34.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00
No. 2 bundles	28.00
Mixed steel scrap	28.00
Mixed borings, turnings	16.00
Rails, remelting	43.00
Busheling, new factory: Prepared	32.00
Unprepared	28.00
Short steel turnings	16.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.



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(*Concluded from page* 125)

Chicago. There have been fears consumption would drop sharply if serious strikes hit the farm equipment industry. Following settlement of the Caterpillar Tractor strike after a 5-day walkout, however, there is optimism the strike called at Deere & Co. plants Aug. 1 may come to an early ending, too.

There is no shortage of pig iron in the Midwest. In the Chicago area, 41 of 43 blast furnaces are operating.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

30,000 tons, approximately, stamping plant for Fisher Body Division, General Motors Corp., at Mansfield, O., to Bethlehem Steel Co., Bethlehem, Pa.; general contractor is the Gilbane Building Co., Providence, R. I.

30,000 tons, approximately, stamping plant for the Fisher Body Division, General Motors Corp., at Marion, Ind., to the American Bridge Division, U. S. Steel Corp., Pittsburgh; joint general contractors are Huber-Hunt & Nichols Inc., Indianapolis, and Ragnar Benson Inc., Chicago.

6500 tons, bakery, National Biscuit Co., Fair Lawn, N. J., to the Ingalls Iron Works, Verona, Pa.

6500 tons, two office buildings, Mutual Benefit Life Insurance Co., Newark, N. J., to Bethlehem Steel Co.; Bethlehem, Pa.; tonnage is comprised of 5400 tons for one (a new home office) and 1100 tons for the other.

5000 tons, office building, State Mutual Life Assurance Co., Worcester, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Turner Construction Co., Boston, general contractor.

3685 tons, contracts 37-JK and 37-M, state turnpike, Lackawanna county, Pa., to Phoenix Bridge Works, Phoenixville, Pa.

2612 tons, eight state bridges, Hampden and Gloucester counties, New Jersey, to Elizabeth Iron Works, Union, N. J.

1500 tons, apartment, E. J. Frankel Co., 19th St. and Locust, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1030 tons, Shelter for Delinquent Children, Bronx, New York, through Gerace & Castagna, general contractors, to the Grand Iron Works, Bronx, New York.

675 tons, Hall of Residence, New York University-Bellevue Medical Center, Manhattan, New York, through Cauldwell-Wingate Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

600 tons, plant addition, Michael Flynn Mfg. Co., Philadelphia, to Frank M. Weaver & Co., Lansdale, Pa.

585 tons, state bridge work, St. Lawrence county, New York, through D. A. Collins, general contractor, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

395 tons, four bridges, Massachusetts turnpike, Otis-Blanford, Mass., to Haarmann Steel Co., Holyoke, Mass.; S. J. Groves & Son Inc., New York, general contractor.

340 tons, building, Newark Plaster Co., Newark, N. J., through Wininger Construction Co., to Bethlehem Fabricators, Bethlehem, Pa.

300 tons, extension, Kaylon plant, United States Rubber Co., Santa Ana, Calif., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, dryer building, Security, Md., for the North American Cement Corp., 41 E. 42nd St., New York, to an unnamed fabricator.

230 tons, state bridges, Sullivan county, New York, through John Arorio, general contractor, to the Pine Brook Iron Works, Scranton, Pa.

225 tons, institutional building, General State Authority, Clark's Summit, Pa., to Wilkes-Barre Iron & Wire Works, Wilkes-Barre, Pa.

225 tons girls' college dormitory, Elizabethtown, Pa., to the High Welding Co., Lancaster, Pa.

175 tons, two stacks and bracing, power plant, Erie Mining Co., Taconite Harbor, Minn., to Bethlehem Steel Co., Bethlehem, Pa.

175 tons, Washington Water Power Co., office and service center, Spokane, Wash., to Union Iron Works, Spokane.

150 tons, building 28-C, Sharp & Dohme, West Point, Pa., to Cantley & Co., Philadelphia.

150 tons, state bridge, Hackensack, N. J., through George M. Brewster & Son, to the Klockner Co.

130 tons, state bridges, St. Lawrence county, New York, through Torrington Construction Co., general contractor, to Ernst Iron Works, Buffalo.

120 tons, bridge reconstruction, Florida East Coast Railroad, St. Augustine, Fla., to an unnamed fabricator.

120 tons, state bridge, Delaware county, New York, through Jess F. Howes, general contractor, to American Bridge Division, U. S. Steel Corp., Pittsburgh.

STRUCTURAL STEEL PENDING

3775 tons, bridges, Indiana toll road, Gary, Ind.; bids Aug. 18, Indianapolis.

2600 tons, state bridge work, Route 42, Camden county, N. J., Public Constructors, Pleasantville, N. J., awarded general contract.

1500 tons, steel sills and checks, Canadian half, power house, St. Lawrence project; bids to Hydro-Electric Power Commission, Ontario; delivery starts Dec. 1, with 100 tons every month.

645 tons, three stringer bridges, Fox Point interchange, north-south freeway, Providence, R. I.; bids Aug. 17; also 800 tons of reinforcing bars.

555 tons, three bridges, interchange, Massachusetts turnpike, West Springfield, Mass.; The Henley Lundgren Co., Shrewsbury, Mass., is low on the general contract.

450 tons, Montana state highway bridge, Phillips county; bids in at Helena, Mont.

235 tons, state turnpike bridge, contract 37-N, Lackawanna county, Pa.; bids Aug. 24.

165 tons, angles and tees, Navy, General Stores Supply Office, Philadelphia; bids Aug. 12.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1320 tons, bridges, Massachusetts turnpike, Ludlow-Chicopee, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Bayer & Mingolla Construction Co., Worcester, Mass., general contractor.

265 tons, four bridges, Massachusetts turnpike, Otis-Blanford, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; S. J. Groves & Son Inc., New York, general contractor.

225 tons, reinforcing and structurals, school building, New Britain, Conn., to Scherer Steel Co., East Hartford, Conn., and Macomber Inc., Canton, O.; Wadhams & May Co., Hartford, general contractor.

100 tons, several Washington state road projects, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1665 tons, bridges and drainage, Indiana toll road, Gary, Ind.; bids Aug. 18, Indianapolis; also 13,000 linear ft steel piling.

751 tons, state highway work, Camden and Gloucester counties, N. J.

640 tons, state highway work, Lackawanna county, Pa.; bids asked.

450 tons, Frederick & Nelson department store, Bellevue, Wash.; Henrik Vallee Co., Inc., Seattle, general contractor.

192 tons, state highway work, City Line, Philadelphia; bids asked.

150 tons, cement silo project, Seattle; bids in.

100 tons, including miscellaneous, Washington state highway project, Spokane county; bids in to Olympia, Wash., Aug. 16.

100 tons plus, Oregon state highway jobs; 565-ft bridge, Douglas county; 120-ft overcrossing and 313-ft bridge, Lincoln county; 175-ft bridge, Linn county; 110-ft and 193-ft grade separations, Malhaur county; bids Aug. 11 to Portland, Oreg.

100 tons plus, Oregon state highway projects; 200-ft bridge, Marion county; two traffic interchange structures, Multnomah county; bids to Portland, Oreg., Aug. 12.

(*Please turn to page* 130)

ATTENTION
FORGE SHOPS

DO YOU NEED A COMMERCIAL PRODUCT TO SELL?

Prominent Hand Tool Manufacturer will dispose of complete, modern machine facilities and tooling for manufacturing

ADJUSTABLE WRENCHES

Includes forging dies, broaching machine, slotters, drilling machines, broaches and fixtures for low cost, high production of all sizes from 4 inch to 15 inch inclusive. Will be sold as complete operating unit.

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24" x 120# PER FOOT—60' LENGTHS
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WANTED—SURPLUS ROD & BAR
Stainless-Aluminum-Steel-Brass
Any size; type and quantity. Cash for termination inventories.
Send lists to:
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FOR SALE
HASTELLOY W-3/16 INCH WELDING WIRE
10,000 pounds available
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Penton Building **Cleveland 13, Ohio**

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Representatives Wanted

MANUFACTURERS REPRESENTATIVE INDUCTION HEATING, well known and nationally advertised low and high frequency line. Should have proper contacts and experience to sell this type of equipment. Prefer organizations with other electric heating lines. Territories available: New England—New York—Philadelphia, Baltimore—Cincinnati, Louisville—St. Louis, Kansas City—West Coast. Reply Box 291, STEEL, Penton Building, Cleveland 13, Ohio.

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excellent operating condition

FOR SALE OR RENT

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- One American Hoist and Derrick **50-TON DIESEL LOCOMOTIVE CRANE,** 65-foot boom, with generator for magnet, new in 1947. Completely overhauled 1954.
- One Industrial Brownhoist **40-TON DIESEL MECHANICAL CRANE,** 55-foot boom, with generator for magnet. Purchased new 1940. Completely overhauled 1955.
- One Industrial Brownhoist **100-TON DIESEL RAILROAD WRECKING CRANE,** completely overhauled and reconditioned.
- **FREIGHT CARS — ALL TYPES BOUGHT, REPAIRED, LEASED OR SOLD — FOR INTER-PLANT OR MAINLINE SERVICE.**
- **SERVICE TESTED FREIGHT CAR PARTS.**
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GENERAL SUPERINTENDENT

STEEL MILL

Thoroughly experienced man for general superintendent of rapidly growing basic steel mill located in central Midwest. Knowledge of hot and cold strip rolling essential. Responsible for execution of company policies, plans and programs, general supervision over and coordination of operations, controlling manufacturing costs, etc. Excellent opportunity and bright future for right man. Give full details of education, experience and salary requirements. Replies will be held in strictest confidence.

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Penton Building Cleveland 13, Ohio

ASSISTANT SUPERINTENDENT

Wanted For

TWO BLAST FURNACE OPERATIONS

28½ feet, and 18½ feet

For details write or wire stating your personal qualifications and experience.

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Used — As Is — Reconditioned

RAILWAY CARS— ALL TYPES

"SERVICE-TESTED"

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline Diesel-Electric

RAILWAY TANK CARS

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6,000—8,000 and 10,000-Gallon Cleaned and Tested

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New York 7, New York
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Immediate Delivery

300 Net Tons

90 lb. ARA-A TIE PLATES

8" x 8¾" Grooved Type

Also Relaying Rails, Spikes, Bolts and Track Turnouts

Write — Wire — Phone

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ATwater 9305

1500 TON FORGING PRESS

H.P.M. 1500 Ton down moving Forging or Hobbing Press, 48 x 48" Platen Area, 12" Stroke, 29" Daylight, 30" Moving Table, 40" Diameter Ram for 2500 PSI with complete Pumping Unit and 100 HP Motor. Good Condition.

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MIchigan 1-2850

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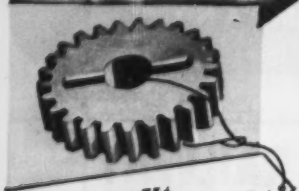
Why pour money into expensive machining operations?

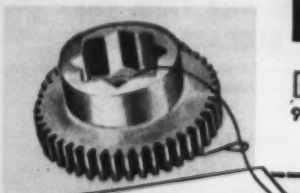
POWDERED METAL PARTS can do the job for *much less!*



Tough, intricate parts ready for assembly without further processing—at *savings of up to 600% over identical machined parts!* No wonder industry chooses Powdermet.*

Low-cost PM parts are die-pressed to close tolerances, have excellent wearability, and a wide range of alloys are available—many exceeding the tensile strengths of mild steel. Through controlled porosity and electrical permeability, many special properties are achieved . . . such as oil-impregnation for life-time self-lubrication. That's why Powdermet* parts are often the *best parts possible* for gears, bearings, filters, etc.

At Yale & Towne, years of experience and technological know-how in powder metallurgy back up every recommendation on PM parts for *your* particular application.



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Name..... Title.....
Company.....
Address.....
City..... Zone..... State.....

(*Concluded from page* 128)

100 tons, city sewage work, Philadelphia; bids asked.

PLATES . . .

PLATES PLACED

290 tons, two tanks, standpipe, to Chicago Bridge & Iron Co., Seattle, by Moses Lake, Wash.

120 tons, pontoon rough tank, Buckeye Pipe Line Co., Samaria, Mich., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

100 tons, elevated water storage tank, Bossier Base, Shreveport, La.; bids Aug. 17. Corps of Engineers, Little Rock, Ark.

PIPE . . .

CAST IRON PIPE PLACED

100 tons, including 50 tons for Centralia, Wash., to Pacific States Cast Iron Pipe Co., Seattle.

CAST IRON PIPE PENDING

200 tons, naval air base, Klamath Falls, Oreg.; bids in July 29.

82 tons, system expansion, Gresham, Oreg.; bids in Aug. 3.

STEEL PIPE PLACED

425 tons, 3000 ft of 60-in. fabricated pipe. W. M. Kellogg Co., Amoco, Va., to Bethlehem Steel Co., Bethlehem, Pa.

RAILS, CARS . . .

LOCOMOTIVES PLACED

New York Central, 61 diesel locomotives to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Northern Pacific, one 1750-hp road switcher and one 1200-hp switcher, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Reading, six general-purpose diesel units, to Fairbanks, Morse & Co., Chicago.

Sacramento Northern, one 600-hp diesel electric unit, to the General Electric Co., Schenectady, N. Y.

Western Maryland, two 1750-hp diesel electric road switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Canadian Pacific, 1640 freight cars, with 200 seventy-ton drop-end gondola cars going to the Eastern Car Co., 40 seventy-ton covered hopper cars to Marine Industries, 200 seventy-ton triple hopper cars and 500 fifty-ton boxcars to the National Steel Car Corp. and 500 fifty-ton boxcars to the Canadian Car & Foundry Co.

Chesapeake & Ohio, 1000 seventy-ton hopper cars to its Russell, Ky., shops.

Chicago Great Western, 50 seventy-ton covered hopper cars to ACF Industries Inc., New York.

Lehigh & New England, 300 fifty-ton boxcars to Pullman-Standard Car Mfg. Co., Chicago.

Lehigh Valley, 200 freight cars, with 100 gondolas going to the Bethlehem Steel Co., Bethlehem, Pa., and 100 fifty-ton boxcars to the ACF Industries Inc., New York.

Norfolk & Western, 1500 all-steel coal-carrying cars: 1000 hoppers and 500 gondolas will be built by American Car & Foundry Division, ACF Industries Inc. at Huntington, W. Va.

Reading, 700 fifty-ton hoppers and 150 seventy-ton covered hoppers to the Bethlehem Steel Co., Bethlehem, Pa.

Rutland Railway, 100 fifty-ton boxcars, to Pullman-Standard Car Mfg. Co., Chicago.

Union Tank Car Co., 450 10,000-gal tank cars, of which 250 will be constructed of aluminum; 320 11,000-gal tank cars and 20 8000-gal tank cars to its own shops.

Virginian, 500 fifty-five-ton steel hopper cars. Previously noted as placed. Will be built in the road's own shops at Princeton, W. Va.

RAILROAD CARS PENDING

Delaware & Hudson, 500 fifty-ton steel sheath boxcars, contemplated.

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Hyde Park

RED CIRCLE Rolls ALLOY-CHILLED

Gray Iron Castings

Hyde Park Castings up to 80,000 pounds are sound, accurate and physically dependable.
Precision machining is done by skilled craftsmen in our modern machine shop.
Send your blue prints for quotation.

Mill Drive

Machine Castings
Lathe Beds
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For finer finish, long life and greater tonnage, specify Red Circle Rolls.

Hyde Park
FOUNDRY & MACHINE CO.
Hyde Park, Westmoreland County, Pa
ROLLS
ROLLING MILL MACHINERY
GREY IRON CASTINGS

High-Pressure Container has 30-in. Wall

This is a billet-container assembly for a 12,000-ton extrusion press. There is a lot more to it than a casual glance would reveal. Though short and squat, it weighs almost 44 tons. The OD is 76 in., the honed ID slightly more than 16 in. Thus the wall surrounding the axial hole is just about 30 in. thick at every point. And the thickness is needed . . . to fully withstand the terrific pressures created during extruding work.

Actually, the body of this husky container is built in layers. The outer layer consists of two large forged rings, side by side. Next comes a heavy forged sleeve. The innermost layer, or liner, is also a forging. Outer rings and sleeve are of chromium-vanadium-molybdenum steel. The liner is made of chromium-vanadium-molybdenum-tungsten hot-work steel.

Bethlehem built the container for Loewy-Hydropress, noted designer of heavy mechanical equipment. This is one of the several important jobs entrusted by Loewy engineers to Bethlehem forge and machine shops. We have the facilities to handle such jobs—from the making of the steel to the final steps of assembly.

But please remember, too, that Bethlehem is just as interested in smaller types of work. Though our shops are equipped to produce and machine the largest forgings ever required, we also make many so small you can hold them on a fingertip.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

This 600 RT Cleveland worm gear speed reducer drives a feeder which delivers limestone to a 30" x 42" jaw crusher. Photo courtesy of St. Paul Quarries, Inc., St. Paul, Ind.

Neither dust-rain-heat nor snow stops a CLEVELAND drive

COATED with dust—exposed to Nature's worst—this rugged Cleveland has never faltered as it drives a 4 x 14 ft. apron feeder at an Indiana rock plant.

Cleveland is an ideal drive for the mining industries because it has a minimum number of moving parts, *all totally enclosed* in a dust-and-moisture-tight housing. Even under the most trying conditions, a Cleveland operates efficiently because worm and gear are accurately matched during manufacture to run smoothly. Cleveland's ability to "take it" is demonstrated by the scores of old units throughout industry still working satisfactorily after 30 to 40 years of continuous service.

That's why we say, "Look to Cleveland," if you want a *really* dependable worm gear drive. Every drive is backed by Cleveland's 43 years of leadership in worm gear manufacture. Write for your free copy of Catalog 400 for complete engineering data. The Cleveland Worm and Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

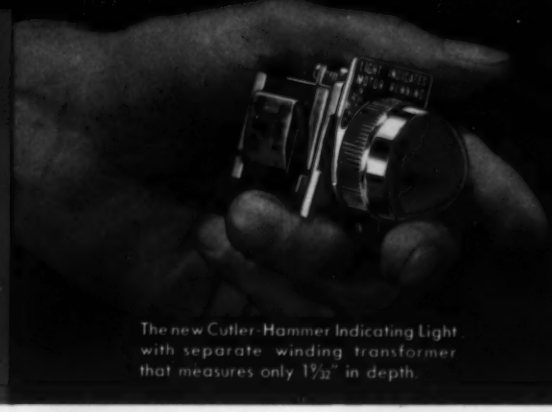
CLEVELAND
Worm Gear
Speed Reducers

THE NEW CUTLER-HAMMER LINE

OF HEAVY DUTY, OILTIGHT

Pushbuttons, Selector Switches and Lights

The new Cutler-Hammer Pushbutton with double pole contact block that measures only 1 1/32" in depth.



The new Cutler-Hammer Indicating Light with separate winding transformer that measures only 1 1/32" in depth.

New shallow-depth contact blocks; greater freedom of circuit arrangements; better design; better appearance; better performance. Get them first, get them fast, get them *now*.

Once again the name Cutler-Hammer companions great achievement . . . an amazing and unique new line of heavy duty, oiltight pushbuttons, selector switches and indicating lights. There is nothing to compare with it. The feature that stands out above all is the new basic working unit, the contact block—and its counterpart for the indicating lights, the transformer or resistor. *THIS NEW CONTACT BLOCK MEASURES ONLY 1-3/32" IN DEPTH BEHIND THE MOUNTING PANEL.* A fact of amazing consequence for the vast majority of pushbutton users.

Of even greater consequence is the greater degree of circuit flexibility this new design provides. With its contacts set side by side, "in parallel," electrically isolated from one another . . . *you can apply one voltage on one set, a different voltage on the other. Or you can impress alternating current on one and direct current on the other.* Each pair of contacts has its own actuating plunger; you can throw both simultaneously, or singly or in sequence.

And you can add contact block to contact block, one behind another, easily, simply, swiftly, giving you virtually unlimited circuit possibilities.

There is a complete range of operators: standard or extended length pushbuttons, with regular or mushroom head; selector switches providing maintained contact or momentary contact with spring return in either or both positions; key operators providing in addition momentary contact that becomes maintained on key withdrawal. Pushbuttons available in 5 colors. All operators are chrome-plated for lasting beauty. Indicating lights have new wide-visibility lenses proved by light-meter reading to be most visible of all from any angle. Lights are available with resistor or separate winding transformer. Transformer type with 6-volt bayonet lamp provides multiplied lamp life where shock and vibration prevail.

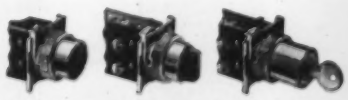
These and many other features are fully described and illustrated in a bulletin just published. Write for it today or see the complete line at your nearest authorized C-H distributor. CUTLER-HAMMER, Inc., 1325 St. Paul Ave., Milwaukee 1, Wis. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ont.

CUTLER-HAMMER
MOTOR CONTROL
C-H

New shallow-depth contact block has electrically isolated contacts, allows different voltage or different current on each pair of contacts.

Three separate contact blocks available; with 1 NO and 1 NC contact; 2 NO contacts; or 2 NC contacts.

Double pole contact blocks mount easily one behind another to provide unlimited circuit combinations.



Every type of operator: pushbutton, selector switch and key operator.

VISIT US at the PRODUCTION ENGINEERING SHOW Navy Pier, Chicago, BOOTHS 423 and 424